ASAR 10.2.2 V1
ASDSF 9.3.1 V1

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10

IN THE MATTER OF: ASARCO, INCORPORATED, a New Jersey Corporation, Pierce County, Washington facility, Proceeding Under Section 106(a) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 [42 U.S.C. § 9606(a)].	)	EPA Docket No. 1086-04-24-106

ADMINISTRATIVE ORDER ON CONSENT

I. JURISDICTION

This Consent Order is issued pursuant to the authority vested in the President of the United States by Section 106(a) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), 42 U.S.C. §9606(a), and delegated to the Administrator of the United States Environmental Protection Agency (EPA) on August 14, 1981, by Executive Order 12316, 46 Fed. Reg. 42237, and further delegated to the Assistant Administrator for Solid Waste and Emergency Response and the Regional

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Administrators by EPA Delegation Nos. 14-14 and 14-14-A, the latter of which was signed on April 16, 1984, and further re delegated by EPA Delegation No.14-14-C to the Regional Division Director for Hazardous Waste on January 7, 1985.

This Consent Order is being issued to ASARCO INCORPORATED (hereinafter ASARCO) who agrees to undertake all actions required by this Consent Order and agrees not to contest EPA jurisdiction regarding this Consent Order.

II. STATEMENT OF PURPOSE

In entering into this Consent Order, the mutual objectives of EPA and ASARCO are to perform a Remedial Investigation/Feasibility Study (RI/FS) (per EPA guidance documents EPA/540/G-85/002 and EPA/540/G-85/003, June 1985 as set forth in the attached Statement of Work): (1) to determine fully the nature and extent of the threat to the public health or welfare or the environment caused by the release or threatened release of hazardous substances, pollutants or contaminants from the site (the remedial investigation), and (2) to evaluate alternatives for the appropriate extent of the removal and/or site stabilization to prevent or mitigate the migration or release or threatened release of hazardous substances, pollutants, or contaminants from the site (the feasibility study).

ASARCO asserts that as a result of the closure of ASARCO's Tacoma smelter emissions of arsenic have been reduced, from approximately 59 tons per year when the smelter was in operation in 1983, to fugitive dust emissions. In addition, ASARCO asserts that it has undertaken facility clean-up which it believes further limits emissions. ASARCO is planning the demolition of portions of the smelter which ASARCO believes will further reduce the potential for emissions. This planned demolition will go forward consistent with the terms of this Consent Order. Ongoing activities on site, (consisting of, but not limited to, on-site materials and/or substances modification or removal, facility "clean-up" activities, demolition, and activities requiring heavy traffic on this site) will be conducted in a manner to minimize ambient arsenic emissions on or around the facility.

The activities conducted pursuant to this Consent Order are subject to approval by EPA and shall be performed in a manner consistent with the National Contingency Plan, 40 CFR Part 300.68 (a)-(j) [47 Federal Register 31180 (July 16, 1982), revised at 48 Federal Register 40658 (September 8, 1983) and revised further at 50 Federal Register 47950 through 47979].

III. FINDINGS OF FACT

A. ASARCO, a New Jersey Corporation, owns a primary copper smelter located in Ruston, Washington. The facility originally began operations in 1890 as a lead smelter under the ownership of the Tacoma Smelter Company. Copper production began in 1902. In 1905 the smelter was purchased by ASARCO. In 1911 lead smelting was discontinued in favor of copper smelting. ASARCO operated the facility as a copper smelter until it ceased copper smelting operations permanently on March 24, 1985.

B. ASARCO owns approximately 97 acres of land bordering on Puget Sound, adjacent to the Town of Ruston, and nearby urban area of Tacoma, Washington, and until March 1985 operated a copper smelting facility occupying approximately 67 of the 97 acres.

C. The custom copper smelting operation at the Tacoma smelter resulted in several by-products, including, but not limited to, arsenic trioxide and heavy metals.

D. During the period from 1912 until 1985 when the facility ceased copper smelting operations, the ASARCO copper smelter in Ruston generally operated 24 hours a day, 7 days a week, except for limited periods of meteorological curtailment and closures, and produced approximately 70,000 tons of anode copper annually.

E. Approximately 1969, ASARCO established an ambient air monitoring network around the facility to monitor suspended particulates including arsenic from the facility.

F. During the period of its operation as a copper smelter, and subsequent thereto, soil samples collected from the ASARCO facility and parts adjacent thereto, have shown the presence of arsenic and heavy metals.

G. During the period of its operation as a copper smelter, and subsequent thereto, groundwater samples collected from wells located at the facility have shown the presence of arsenic as well as the presence of heavy metals.

H. Hazardous materials, particularly arsenic, migrating from the site by surface water, groundwater and air pathways may affect human health and other ecosystems.

1. Surface water runoff may transport contaminants deposited on the ground or leached from materials such as, but not limited to, flue dust to Puget Sound.

2. Contaminants could enter the groundwater by percolation of contaminated surface water, and by leaching from flue dust and contaminated soil. Groundwater movement could also transport contaminants to Puget Sound. Possible fates of arsenic in groundwater are: removal of soluble arsenic by leaching, incorporation into soil, or incorporation into organic matter or biota in soil.

3. Contaminants transported by fugitive dust emissions could be deposited on plants, buildings and soil.

I. The terrestrial and aquatic organisms and human population in nearby residential areas, in Puget Sound, and in the surrounding industrial area would be the possible receptors of any hazardous materials migrating offsite.

1. Human exposure to arsenic or its derivatives, can result from the consumption of food or water containing arsenic, the inhalation of arsenic in air or in contaminated particles, the ingestion of soil and dust particles containing arsenic and skin absorption through direct contact.

2. Arsenic compounds may affect humans in a variety of ways, depending on the route of exposure (air, water, food), the concentration of arsenic and its chemical form. The concentrations of arsenic inhaled by humans may depend on, but is not limited to,

climatic conditions, particle size of the transported material, and the proximity of the individuals to the site.

3. Arsenic exposure has been linked to increased incidence of human lung and skin cancer.

4. Arsenic compounds may affect humans in other ways which have not yet been linked to emissions from the Tacoma smelter. Health effects may include either acute or chronic responses. Typical acute symptoms include gastro-intestinal and cardiovascular reactions while chronic symptoms include lesions of the skin, damage to the nervous system, effects on the cardiovascular system, and neoplasms.

J. Tetra Tech, Inc. in its August 1985 final report entitled Potential Remedial Technologies for the Commencement Bay Nearshore/Tideflats Remedial Investigation prepared for EPA and the Washington Department of Ecology, found the sediments located near the ASARCO facility to be one of the two areas containing the most contaminated sediments tested as part of the study.

K. ASARCO does not admit and specifically denies Findings of Fact H, I, and J.

IV. CONCLUSIONS OF LAW

A. The site where ASARCO performed smelting operations is a "facility" as defined in 42 U.S.C. §9601(9).

B. ASARCO is a "person" pursuant to 42 U.S.C. §9601(21).

C. Arsenic and other heavy metals which were released into the environment from the site are "hazardous substances" as defined in 42 U.S.C. §9601(14).

D. Arsenic and other heavy metals which were found in the soil, sediment and other locations at the site, constitute a "release" into the environment pursuant to 42 U.S.C. §9601(22).

E. ASARCO is the owner and operator of the facility from which the release occurred and is subject to liability pursuant to 42 U.S.C. §9607(a)(1).

F. ASARCO does not admit and specifically denies all Conclusions of Law and Determinations set forth in this Administrative Order on Consent.

V. DETERMINATIONS

A. On the basis of the findings from the site investigations, ambient air monitoring, and all other information available, the Regional Administrator of EPA has determined that (pursuant to Section 106 of CERCLA, 42 U.S.C. §9606) there may be an imminent and substantial endangerment to the public health or welfare or the environment because of an actual or threatened release of a hazardous substance from the facility.

B. Under Section 106 of CERCLA, 42 U.S.C. §9606, the Regional Administrator has been delegated the authority to issue orders to secure such relief as may be necessary to protect the public health or welfare and the environment.

VI. AGREEMENT AND WORK TO BE PERFORMED

A. ASARCO hereby agrees to conduct the evaluation of and implementation of Initial Remedial Measures (IRM) in accordance with the National Contingency Plan (NCP), including §300.68, for the removal and/or containment of any contaminated soils, groundwater and/or other contaminated materials at the ASARCO site with regard to planned demolition and other site stabilization efforts.

B. The tasks required for this initial remedial measure which ASARCO agrees to, and are approved by EPA, are set forth in the Statement of Work which is incorporated herein by reference as Attachment A.

C. ASARCO hereby agrees to conduct a Remedial Investigation/Feasibility Study, ("RI/FS") to evaluate remedial alternatives for the clean-up and stabilization of this site.

D. The tasks required by the RI/FS which ASARCO agrees to, and are approved by EPA, are set forth in the Statement of Work which is incorporated herein by reference as Attachment B.

E. All work performed pursuant to this Consent Order shall be under the direction and supervision of qualified personnel, and is described more fully in the Statements of Work.

F. ASARCO shall direct its employees or contractor(s) to proceed with work on task one in each Statement of Work within seven calendar days of receipt of a copy of this Order signed by EPA and the ASARCO Vice-President for Smelting and Refining. Performance periods for elements of the Statements of Work shall be as agreed to in the Statements of Work attached hereto, or as included in plans submitted by ASARCO and approved by EPA, as ASARCO proceeds to execute the tasks included in the Statements of Work.

G. ASARCO shall provide the deliverables to EPA requested in the outlined performance periods as defined in the Statements of Work. These deliverables shall include reports to EPA according to the schedule contained in the Statements of Work and this Consent Order. These reports shall include monthly progress reports to EPA which will at a minimum: (1) describe the actions which have been taken toward achieving compliance with this Consent Order, (2) include all results of sampling and tests and all other data received by ASARCO, and (3) include all plans and procedures completed subsequent to the effective date of this Consent Order or since the previous progress report as well as such actions, data, and plans which are scheduled for the upcoming two months.

H. EPA shall review the reports and within 30 calender days of receipt by EPA of such reports, EPA shall notify ASARCO in writing of EPA's approval or disapproval of these reports or any part thereof. In the event of any disapproval, EPA shall specify in writing both the deficiencies and the reasons for such disapproval.

I. Documents, including reports, approvals, disapprovals, and other correspondence, to be submitted pursuant to this Consent Order, shall be sent to the Project Coordinators at the following addresses:

1. Ms. Carol Thompson
USEPA, Region 10
1200 Sixth Avenue
Seattle, Washington 98101

2. Mr. C.E. Dungey
ASARCO, Inc.
P.O. Box 1677
Tacoma, Washington 98401

VII. DESIGNATED PROJECT COORDINATORS

A. EPA and ASARCO hereby designate as their respective Project Coordinators the individuals listed in Paragraph VI. above. Each Project Coordinator shall be responsible for overseeing the implementation of this Consent Order. The EPA Project Coordinator or EPA's designated representative shall have the authority vested in the On-Scene Coordinator by the National Contingency Plan at 40 C.F.R. Part 300, as amended. To the maximum extent possible, communications between ASARCO and EPA and all documents, including reports, approvals, and other correspondence concerning the activities performed pursuant to the terms and conditions of this Consent Order, shall be directed through the Project Coordinators.

B. EPA and ASARCO each have the right to change their respective Project Coordinator. Such a change shall be accomplished by notifying the other party in writing at least five (5) calendar days prior to the change.

C. The absence of the EPA Project Coordinator from the site shall not be cause for the stoppage of work.

VIII. QUALITY ASSURANCE

A. ASARCO shall use quality assurance, quality control, and chain of custody procedures in accordance with EPA document

QAMS-005/80, and Region 10's QA Project Plan Guidance Manual throughout all sample collection and analysis activities. ASARCO shall consult with EPA in planning for, and prior to, all sampling and analysis as detailed in the Statements of Work. In order to provide quality assurance and maintain quality control regarding all samples collected pursuant to this Consent Order, ASARCO shall:

1. Ensure that EPA personnel and/or EPA authorized representatives are allowed access to the laboratory(s), and personnel utilized by ASARCO for analyses.

2. Ensure that the laboratory(s) utilized by ASARCO for analyses perform such analyses according to EPA methods or methods deemed satisfactory to EPA and submit all protocols to be used for analyses to EPA at least two weeks prior to the commencement of analyses.

3. Ensure that laboratory(s) utilized by ASARCO for analyses agree to participate in an EPA quality assurance/performance and system audit program. As part of such a program, and upon request by EPA, such laboratory(s) shall perform analyses of samples provided by EPA to demonstrate the quality of each laboratory's analytical data.

IX. SITE ACCESS

A. ASARCO shall permit EPA, and its contractors and consultants to have reasonable access to their property and to monitor any activity conducted pursuant to the RI/FS and Initial Remedial Measure. This requirement to permit access does not oblige ASARCO to provide access to any person or for any activity or investigation outside the scope of this Consent Order.

B. EPA and ASARCO acknowledge that the ASARCO facility contains dangerous conditions, both known and unknown, and agree to inform their employees and contractors that dangerous conditions, both known and unknown, exist.

X. SAMPLING, ACCESS, AND DATA/DOCUMENT AVAILABILITY

A. ASARCO shall make the results of all sampling and/or tests or other data generated by ASARCO, or on ASARCO's behalf, with respect to the implementation of this Consent Order, available to EPA and shall submit these results as available.

B. At the request of EPA, ASARCO shall allow split or duplicate samples to be taken by EPA and/or its authorized representatives, of any samples collected by ASARCO pursuant to the implementation of this Order. ASARCO shall notify EPA not less than one (1) week (seven calendar days) in advance of any sample collection activity.

C. In connection with the site access provided in Paragraph IX of this Consent Order, EPA and/or any EPA authorized representative shall at least have the authority to enter and freely move about the site at all reasonable times for the purposes of, inter alia: inspecting records, operating logs, and contracts related to the Consent Order and/or RI/FS and/or Initial Remedial Measure; reviewing ASARCO's progress in carrying out the terms of this Consent Order; conducting such tests as EPA or the Project Coordinator deem necessary, using a camera, sound recording, or other documentary type equipment; and verifying the data submitted to EPA by ASARCO. ASARCO shall permit such persons to inspect and copy all records, files, photographs, documents, and other writings, including all sampling and monitoring data, in any way pertaining to work undertaken pursuant to this Consent Order. All parties with access to the site pursuant to this paragraph shall comply with all approved health and safety plans.

D. ASARCO may assert a confidentiality claim, if appropriate, covering part or all of the information requested by this Consent Order pursuant to 40 C.F.R. §2.203(b). Such an assertion shall be adequately substantiated when the assertion is made. Analytical data shall not be claimed as confidential by ASARCO. Information determined to be confidential by EPA will be afforded the protection specified in 40 C.F.R. Part 2, Subpart B. If no such claim accompanies the information when it is submitted to EPA, it may be made available to the public by EPA without further notice to ASARCO.

XI. RECORD PRESERVATION

A. EPA and ASARCO agree that each shall preserve during the pendency of this Consent Order and for a minimum of six (6) years after its termination, all records and documents in their possession or in the possession of their divisions, employees, agents, accountants, contractors, or attorneys which are not legally privileged, and which relate in any way to this Consent Order or the RI/FS or Initial Remedial Measure, despite any document retention policy to the contrary. If EPA desires to have the records retained beyond the six year period, it shall notify ASARCO in writing thirty (30) days prior to the end of the six year period. ASARCO will transmit the records to EPA if so requested. Except as outlined above, ASARCO shall have no obligation to retain the records beyond the six year period.

XII. DISPUTE RESOLUTION

A. IF ASARCO objects to any EPA notice of disapproval or decision made pursuant to this Consent Order, ASARCO shall notify EPA in writing of its objections within fourteen (14) days of receipt of the notice of disapproval or the decision. EPA and ASARCO shall then have an additional fourteen (14) days from the receipt by EPA of the notification of objection to reach agreement.

B. If EPA and ASARCO cannot reach agreement on any issue within fourteen (14) days after receipt by EPA of the notification of objection, EPA shall provide a written statement of its decision to ASARCO. EPA's written statement of decision provided to ASARCO pursuant to this section shall be deemed to be a final agency action for the purposes of judicial review within the meaning of §704 of the Administrative Procedures Act, 5 U.S.C. §704. EPA and ASARCO agree that the venue for resolution of disputes arising under this Consent Order shall be in the United States District Court for the Western District of Washington. EPA and ASARCO agree that the consent of EPA to judicial review in this Consent Order is limited to this order alone and is case-specific. EPA and ASARCO agree that EPA's consent to judicial review in this Order is not precedential to those instances where EPA does not consent to judicial review. This Order shall not be used against EPA in any proceeding not involving this Order.

C. EPA and ASARCO agree that this section pertaining to dispute resolution can only be invoked for those disputes which ASARCO can demonstrate involve acts or omissions which, if performed, involve direct monetary expenditures by ASARCO of Ten Thousand and 00/100 Dollars ($10,000.00) or more. This dispute resolution section shall not be invoked by ASARCO for purposes of delay.

D. EPA and ASARCO agree that stipulated penalties as set forth in paragraph XIII shall continue to accrue according to the provisions of paragraph XIII, even if ASARCO petitions the United States District Court for judicial review pursuant to this section, until completion of review, further order of the court or other agreement between ASARCO and EPA.

XIII. DELAY IN PERFORMANCE/STIPULATED PENALTIES

A. For delays by ASARCO in submitting a report or otherwise failing to achieve on time the requirements of this Consent Order referenced in subparagraph B of this paragraph, EPA may require that ASARCO shall pay into the United States Treasury, the sums set forth below as stipulated penalties. Checks should be addressed to: U.S. Environmental Protection Agency Region 10, Superfund Accounting, P.O. Box 371003M, Pittsburgh, Pennsylvania 15251.

B. Stipulated penalties shall accrue in the amount of:

1. Failure to submit Sampling and Quality Assurance plans per agreed-upon schedule: $100.00 per day.

2. Failure to begin field studies or laboratory analysis per agreed-upon schedule: $200.00 for the first seven calendar days or any fraction thereof and $400.00 for each seven days thereafter.

3. Failure to submit the final RI/FS report per the agreed-upon schedule: $1,000.00 for the first seven calendar days or any fraction thereof, and $2,000.00 for each seven such days thereafter.

C. The stipulated penalties set forth in this Section do not preclude EPA from electing to pursue any other remedies or sanctions which may be available to EPA by reason of ASARCO's failure to comply with any of the requirements of this Consent Order. Such remedies and sanctions include a suit for statutory penalties as authorized by Section 106 of CERCLA, for a federally-funded response action.

XIV. RESERVATION OF RIGHTS

A. This Consent Order shall not be construed in any way as a waiver or limitation of rights which EPA has by statute, regulation or other applicable law.

B. EPA further reserves the right to conduct other investigations and activities at the site which EPA in its judgment deems appropriate, and further retains all rights against any entity not a signatory to this document which may arise out of the facts upon which this Consent Order is based.

C. ASARCO has not waived and is not found to have waived any defense or objection to this Consent Order (other than EPA's jurisdiction to issue this Order), which may be raised in any proceeding whatever by consenting to this Consent Order or by implementing any task in the Statements of Work attached hereto.

XV. REIMBURSEMENT OF COSTS

A. This Consent Order shall not be construed in any way as a waiver or limitation on EPA's right to seek reimbursement from any responsible party, including entities not a signatory to this Consent Order, pursuant to 42 U.S.C. §9607 for recovery of all response and oversight costs incurred by the United States in connection with response activities pursuant to CERCLA at this Site.

B. This Consent Order does not constitute any decision on preauthorization of funds under Section 111(a)(2) of CERCLA.

XVI. OTHER APPLICABLE LAWS

A. All actions required to be taken pursuant to this Consent Order shall be undertaken in accordance with the requirements of all applicable local, state, and federal laws and regulations unless an exemption from such requirements is provided for in the National Contingency Plan, 40 C.F.R. 300.68(a)(3) as published in the Federal Register at 50 Fed. Reg. 47973 (November 20, 1985), or as provided in this Consent Order. Off-site disposal of hazardous substances, if required by this Consent Order, shall comply with the EPA Off-Site Policy, as stated in the McGraw letter dated May 6, 1985, as published in the Federal Register at 50 Fed. Reg. 45933 (November 5, 1985).

XVII. NON-LIABILITY OF GOVERNMENT

The United States Government shall not be liable for, and ASARCO shall indemnify it from any judgment arising out of any injuries or damages to persons or property resulting from acts or omissions of ASARCO, its employees, agents or contractors in carrying out the activities pursuant to this Consent Order, nor shall the United States Government be held as a party to any contract entered into by ASARCO, its employees, agents, or contractors in carrying out activities pursuant to this Consent Order.

XVIII. PUBLIC COMMENT

A. Upon submittal to EPA of an approved Feasibility Study Final Report, EPA shall make both the Remedial Investigation Final Report and the Feasibility Study Final Report available to the public for review and comment for, at a minimum, a twenty-one (21) day period, pursuant to EPA's Community Relations Policy. Following the public review and comment period, EPA shall notify ASARCO's designated Project Coordinator whether a remedial action and/or initial remedial measure alternative has been approved for the site, and if so, the identity of that action or measure.

XIX. EFFECTIVE DATE AND MODIFICATION

A. This Consent Order is effective on the date it is signed by both EPA's Hazardous Waste Division Director and ASARCO's Vice President for Smelting and Refining. In consideration of the numerous communications between members of ASARCO and EPA prior to the issuance of this Consent Order, ASARCO agrees that there is no need for a settlement conference prior to the effective date of this Consent Order.

B. This Consent Order may be amended by mutual agreement of EPA's duly authorized representative, and ASARCO's designated Project Coordinator. Such amendments shall be in writing signed by both parties and shall have as the effective date, that date on which such amendments are signed by EPA.

C. Any reports, plans, specifications, schedules, and attachments required by this Consent Order are, upon approval by EPA, incorporated into this Consent Order. Any noncompliance with such EPA approved reports, plans, specifications, schedules, and attachments shall be considered a failure to achieve the requirements of this Consent Order and will subject ASARCO to the provisions included in the "Delay in Performance/Stipulated Penalties" Section (Section XIII) of this Consent Order.

D. No informal advice, guidance, suggestions, or comments by EPA regarding reports, plans, specifications, schedules, and any other writing submitted by ASARCO will be construed as relieving ASARCO of their obligation to obtain such formal approval as may be required by this Consent Order.

XX. PARTIES BOUND

A. This Consent Order shall apply to and be binding upon ASARCO and EPA, their agents, successors, and assigns and upon all persons, contractors, and consultants acting under or for either ASARCO or EPA or both.

B. ASARCO shall provide a copy of this Consent Order to all contractors, sub-contractors, laboratories, and consultants retained to conduct any portion of the work performed pursuant to this Consent Order within fourteen (14) calendar days of the effective date of this Consent Order. If additional contractors, subcontractors, laboratories and consultants are retained after the fourteen (14) day period, ASARCO shall provide them a copy of this Consent Order within seven (7) days of such employment.

XXI. FORCE MAJEURE

A. If any event occurs which causes delay and effectively precludes compliance with the terms of this Consent Order, ASARCO shall promptly notify EPA orally and shall, within seven (7) days of oral notification to the agency, notify EPA in writing of the anticipated length and cause of the delay, the measures taken and to be taken by ASARCO to prevent or minimize the delay, and the timetable by which ASARCO intends to implement these measures. If ASARCO demonstrates that the delay or anticipated delay has been or will be caused by circumstances beyond the reasonable control and despite the due diligence of ASARCO, the time for performance hereunder shall be excused or extended for a period equal to the delay resulting from such circumstances. However, neither increased costs of performance of the terms and conditions of the Consent Order or changed economic circumstances may be considered circumstances beyond the reasonable control of ASARCO.

XXII. NOTICE TO THE STATE

A. EPA has notified the State of Washington pursuant to the requirements of Section 106(a) of CERCLA.

XXIII. TERMINATION AND SATISFACTION

A. The provisions of this Consent Order shall be deemed satisfied upon ASARCO's receipt of written notice from EPA that ASARCO has demonstrated, to the satisfaction of EPA, that all of the terms of this Consent Order (including any tasks which EPA has determined to be necessary in order to carry out the terms of this Consent Order and Statements of Work or other agreements between the parties) have been completed.

B. ASARCO shall submit a written notice to EPA upon completion of all the terms of this Consent Order, indicating that in ASARCO's opinion, the tasks required by the Consent Order have been completed. EPA shall either accept or reject ASARCO's notice of completion within 30 days of receipt by issuing a written notice to that effect. If EPA elects to reject ASARCO's notice of completion, EPA shall include in its written notice of rejection a

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detailed statement identifying the terms of this Consent Order which EPA considers incomplete.

IT IS SO AGREED AND ORDERED:

BY: Armand L. Labbe — Sept 9, 1986
Armand L. Labbe, Vice-President
Smelting and Refining Department
Date

Charles E. Findley — Sept 10, 1986
U.S. Environmental Protection Agency
Hazardous Waste Division Director
Date

Form OBD-183
12-8-76 DOJ

ATTACHMENT A
TO
ADMINISTRATIVE ORDER ON CONSENT

TACOMA PLANT
ASARCO INCORPORATED

SITE STABILIZATION PLAN

COTTRELLS, BRICK FLUES, ARSENIC PLANT
AND MISCELLANEOUS STRUCTURES

August 20, 1986

PREFACE

This Site Stabilization Plan was developed pursuant to Section VI of the Administrative Order on Consent, Environmental Protection Agency (EPA) Docket No. 1086-04-24-106, negotiated between EPA and ASARCO, Incorporated. The Plan will be incorporated in the Order as Attachment A.

The purpose of the Plan is to allow the evaluation and implementation of certain initial remedial measures at ASARCO's Tacoma Plant, in accordance with the National Contingency Plan (including 40 CFR Section 300.68). These initial remedial measures include the removal and/or containment of contaminated materials at the site through demolition of various facilities and other site stabilization efforts.

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SUMMARY

ASARCO proposes to accomplish certain site stabilization activities at its Tacoma Plant by demolishing various facilities that were associated with copper smelting and the production of arsenic trioxide and metallic arsenic. These facilities include electrostatic precipitators, brick flues, the arsenic plant, and miscellaneous structures. The mechanics of demolishing these facilities is discussed in detail in this Site Stabilization Plan. This summary emphasizes environmental considerations, as well as methods of disposal for the various materials generated during the demolition process. The procedures described represent the best prediction of procedures that will actually be used, but may require modification if unforeseen problems are encountered during demolition.

ENVIRONMENTAL CONSIDERATIONS

Control of Fugitive Dust Emissions

Historically, many of the structual components in the area of the proposed demolition have been either directly or indirectly in contact with process materials. Some of the process materials, including flue dust, contain inorganic arsenic. Therefore, there is a possibility that fugitive dust emissions containing arsenic may result if precautions are not taken during the demolition process. To minimize the potential for fugitive dust emissions, a two-step procedure will be followed:

1. Before demolishing any building or structure, the facility will be cleaned to the extent practicable. This will include removing any remaining dust from all flues, hoppers, conveyors and dust collection equipment. Settled dust will then be removed from components using vacuum cleaning systems where possible. To reach settled dust in inaccessible areas, water washing techniques will be used. Collected dust will either be shipped to an appropriate

facility for recovery of metal values or to a CERCLA-approved hazardous waste disposal facility. Wash water will be collected in the drainage system described in Section III.C.

2. After the preliminary cleaning described above, most structures should be relatively free of dust accumulations before demolition begins. To minimize fugitive dust emissions during demolition, high pressure water fogging nozzles will be used. Other dust control methods were considered, such as the use of wetting agents and polymers. However, these methods are more suitable for controlling dust from exposed surfaces that are to remain undisturbed. During demolition, new surfaces will continually be exposed and disturbed. Furthermore, ASARCO has used wetting agents in the past in connection with the handling of feedstocks and found them to be no more effective than water.

Throughout the demolition process ASARCO will conduct monitoring of ambient arsenic concentrations to assess the above control techniques. The monitoring network will consist of six low-volume samplers bracketing the site, and a monitor at Vashon or Maury Island. ASARCO will also operate and maintain a meteorological station at the site to measure wind speed and direction. A meteorological curtailment program will be in effect during demolition.

Surface Water Management

Some surface water runoff will be generated from water sprays used in dust suppression or cleaning of steel. Because this water would contain contaminants, it will be managed in such a manner as to minimize its volume and prevent it from being discharged into the environment.

Most surface water resulting from dust suppression, cleaning, or rainfall will enter one of several subsurface drains depicted in Figure 3 of the plan (p. 13). These drains will allow water to flow by gravity to one of two collection points (the concrete basin south of the acid plant and concrete sumps northeast of the No. 3 boiler building) for pumping by overhead line to the waste water evaporation system at the north end of the plant. Water not contained in this system will include water used for dust suppression at the three plate treater buildings and water used during removal of the arsenic trioxide storage bunkers. Surface water runoff generated at these locations will be collected within the concrete foundation of each structure and pumped to a collection point for the waste water system.

The water collection system shown in Figure 3 and described above was inspected by EPA and other agencies to determine system integrity. ASARCO will take the measures recommended by EPA and listed in Section III.C of this plan to ensure that the drainage system is functioning properly.

Health and Safety

A number of measures will be taken to protect the health and safety of workers involved in the demolition process. These will include instruction materials and training; use of worker protective equipment, such as respirators, coveralls, and gloves; provision of shower facilities and changerooms; personal air sampling; and biological monitoring. The Health and Safety Plan to be developed as one of the first tasks of the remedial investigation/feasibility study (RI/FS) will specify more specific procedures, and will be incorporated into this demolition plan.

Existing plant security measures intended to discourage unauthorized entry to the site will continue throughout implementation of the Site Stabilization Plan. These measures include cyclone fencing around the entire plant site; requiring individuals entering the site during working hours to report to the main office before proceeding into the plant; and providing security guard patrols during non-working hours.

Another safety consideration is the crossing of Ruston Way by trucks transporting material from the demolition area to temporary storage at the fine ore bins or incineration at the converter. Appropriate measures will be taken to flag and direct traffic on Ruston Way during truck crossings to eliminate the potential for accidents that may result in releases of hazardous materials.

SAMPLING AND DISPOSAL OF MATERIALS

Demolition Materials

Various types of materials will be generated during demolition of structures, including wood, steel, brick, asbestos materials, flue dust, and other miscellaneous materials. Following is a brief review of disposal options for the primary types of material to be generated.

- Wood. Any wood or other combustible materials generated during demolition can be disposed of by:

    a. Incinerating it in a former production vessel called a converter. Particulates from the incineration process will be collected by an electrostatic precipitator located at the acid plant. Incineration will substantially reduce the volume of material requiring transport and disposal. The residual ash will be shipped to ASARCO's East Helena lead smelter for recovery of metal values. To ensure that incineration will not result in excessive emissions, a performance test of the converter will be conducted prior to use. No testing of combustible materials will be required if this option is selected.

    b. Transporting it to a CERCLA-approved hazardous waste disposal facility. If this option is selected, testing will be conducted only to the extent necessary to meet the requirements of the disposal facility.

If ASARCO wishes to ship any wood off site other than as described in b above, it must be tested to ensure that it is sufficiently clean for the intended use or disposal method. Testing will be conducted using the EP-toxicity test on representative samples.

o **Steel**. Any steel generated during demolition can be disposed of by:

a. Transporting it to a CERCLA-approved hazardous waste disposal facility. If this option is selected, testing will be conducted only to the extent necessary to meet the requirements of the disposal facility.

b. Shipping it to ASARCO's East Helena smelter for use in the lead blast furnace. No testing will be required if this option is selected.

If options a or b are implemented immediately upon demolition, no cleaning of the steel will be required. If the steel is to be placed in storage pending disposal, the EPA OSC shall determine whether cleaning is necessary based on the degree of visible contamination and the length of time to be stored.

Steel that shows no visible signs of contamination can be collected in batches without testing and shipped to a scrap dealer or industry that has the capability to process the steel by smelting. To verify that steel shipped by the Tacoma Plant is accepted as a batch for batch processing, a form will be developed that is mutually acceptable to EPA's and ASARCO's OSC.

If ASARCO wishes to ship any steel off site other than as described above, the steel must be swab tested to ensure that it is sufficiently clean for the intended use or disposal method. Steel that is determined by swab testing to have unacceptable levels of contamination will be cleaned and retested.

- **Brick and Concrete**. Any brick or concrete generated during demolition can be disposed of by transporting it to a CERCLA-approved hazardous waste disposal facility. If this option is selected, testing will be conducted only to the extent necessary to meet the requirements of the disposal facility.

  If ASARCO wishes to ship brick and concrete off site other than as described above, it must be tested to ensure that it is sufficiently clean for the intended use or disposal method. Brick and concrete from locations historically not in direct contact with flue dust can be tested by swab sampling. Brick and concrete from other locations will be tested using the EP toxicity test on representative samples obtained by chipping or boring.

- **Asbestos Materials**. Asbestos-bearing materials will be removed and disposed of in accordance with regional, state, and federal regulations. To the extent practicable, this removal and disposal will take place before demolition begins. This will include asbestos wall and pipe insulation. Transite roofing will be removed carefully in sheets during the demolition process.

- **Flue Dust**. Flue dust remaining in No. 2 brick flue will undoubtedly be mixed with brick flue rubble once demolition begins. Therefore, it is anticipated that all this material will be transported to a CERCLA-approved hazardous waste disposal facility.

As demolition materials are generated, they will either be stored on site until a final disposal method is determined or removed immediately from the plant site if the disposal method is known. Asbestos insulation materials will be removed and disposed of as they are generated. Materials such as wood, steel and brick will be stored either at the fine ore bins or converter aisle. Both of these areas are covered and protected so that materials will not be subject to wind dispersion or surface water runoff from rain. To prevent cross-contamination, one or two ore bins will be designated for the storage of materials which appear to be not contaminated, pending the results of testing. The remaining bins will be used to store contaminated materials.

If materials are tested to determine their disposition, the test results will accompany the shipment to its destination. In cases where the destination is a regulated, approved landfill for non-hazardous materials, prior to transportation appropriate testing will be conducted (including EP toxicity testing, if required), and test results will be discussed with the county health department having jurisdiction over the landfill. Materials will not be transported until any necessary waste disposal authorization has been obtained. Off-site disposal of hazardous materials shall comply with the EPA Off-Site Policy in accordance with Section XVI of the Administrative Order on Consent.

Soils

Soils beneath the brick flues and other structures may be contaminated with process materials. Sampling and analysis of the soils will be conducted in accordance with the sampling plan. Temporary precautions such as covering certain areas will be taken pending the results of the analyses. The need to remove and dispose of exposed soils will be determined based on results of the RI/FS.

Evaporation System Residue

Residue that accumulates in the waste water evaporation system will be shipped to ASARCO's lead smelter in East Helena, Montana for recovery of metal values.

I. INTRODUCTION

ASARCO Incorporated is proposing to accomplish certain site stabilization activities at its Tacoma Plant by demolishing various facilities that were associated with copper smelting and the production of arsenic trioxide and metallic arsenic. Due to the accumulation of arsenical dust in these facilities over the years, and the potential for deterioration of the structures with further aging, they are considered to pose a greater environmental risk than other facilities on the ASARCO site. Structures to be demolished are shown in Figure 1, and include:

1. Cottrells (electrostatic precipitators), including the No. 1 pipe treater and No. 1 and No. 2 plate treaters.

2. Cottrell powerhouse and changehouse.

3. The remaining portions of No. 1 and No. 2 brick flues. Priority in demolition will be given to the area of the flues shown in Figure 1.

4. Silo and pneumatic conveyor system.

5. Arsenic plant, including the roof and supporting structures, the metallic arsenic area, the Godfrey roasters, the arsenic kitchens, the fan building, the bunker building, and the arsenic trioxide storage bins.

The remainder of the Site Stabilization Plan is divided into three sections. Section II discusses preliminary work that has been done or will be done prior to demolition, including the clean-up of the area of brick flue collapse shown in Figure 1. Section III describes the actual demolition work, including step-by-step procedures for demolishing each structure and environmental controls that will be implemented. Section IV describes methods for sampling, transport, and disposal of each type

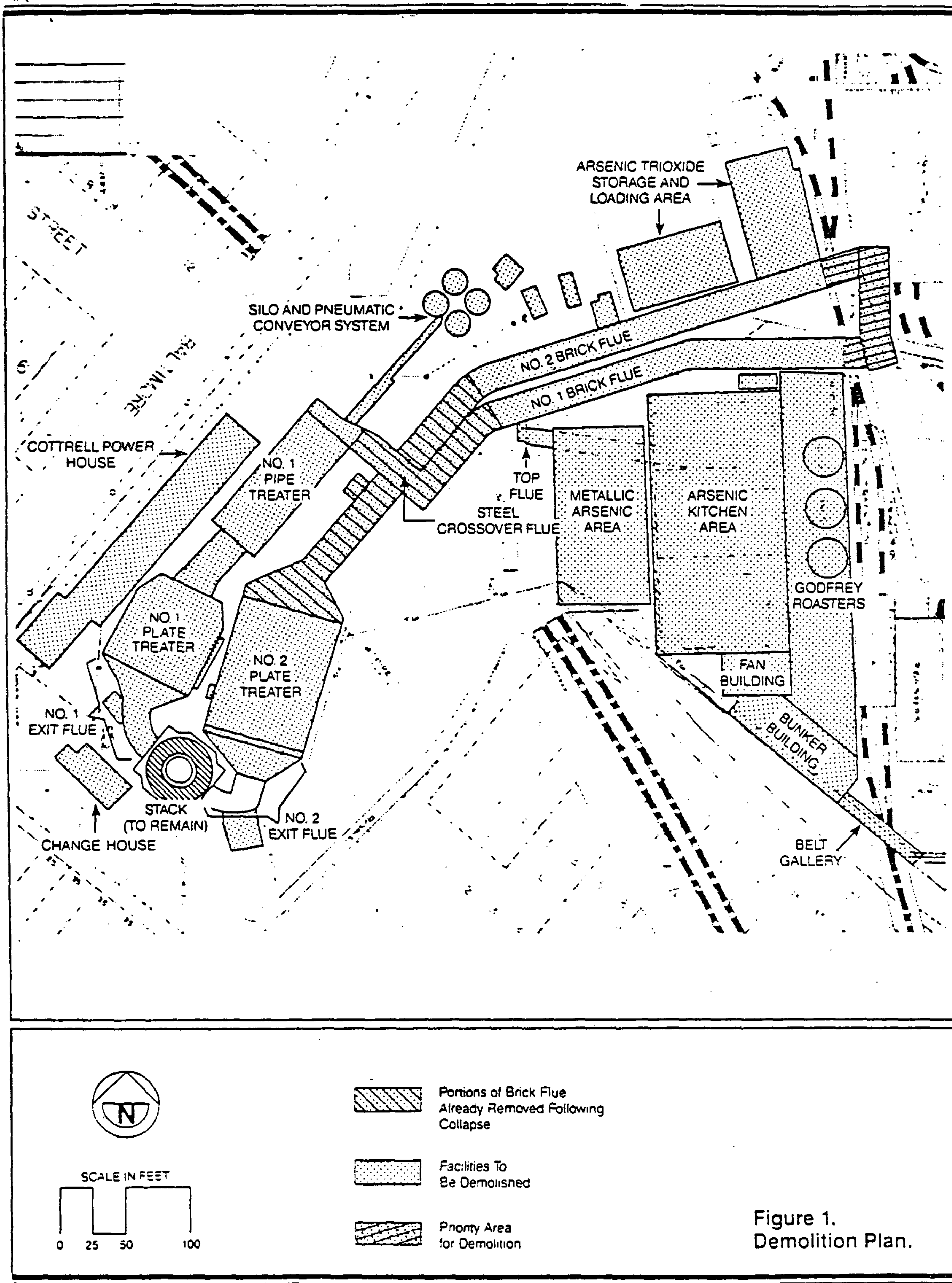


Figure 1.
Demolition Plan.

of material generated during demolition, including wood, steel, brick, asbestos, and flue dust. The potential for having to dispose of contaminated soils is also discussed in Section IV. Section V discusses health and safety considerations.

The procedures described in the Site Stabilization Plan represent the best prediction of procedures that will actually be used, based on observable site conditions at this time. However, it is possible that the demolition contractor will encounter unforeseen problems that may require modifications to the procedures described in the plan. Therefore, the plan should be regarded as subject to change depending on the actual site conditions encountered during demolition.

II. PRELIMINARY WORK

ASARCO has conducted and will conduct a number of preliminary cleanup activities to minimize the potential for fugitive dust emissions and other environmental impacts during implementation of this Site Stabilization Plan. The major items of preliminary work are discussed below.

A. DUST REMOVAL

1. Brick Flues

Dust in No. 1 and No. 2 brick flues was removed by pulling the dust from the flues with a scraper to railroad gondola cars located in a passageway between the arsenic plant and the waste heat boiler areas. This cleaning operation, called "flue pulling," was conducted on a periodic basis during the years when copper smelting took place on site. However, the cleaning conducted to prepare the flues for demolition was more thorough than previous routine cleaning operations. As discussed in Section II.B, flue pulling was not completed due to the unexpected collapse of a portion of the flues. The remaining flue dust will be removed during demolition.

The potential for fugitive dust emissions during flue pulling was reduced through the use of water sprays as well as plastic strips on either end of the flue section being pulled. Dust generated inside the flue structures was transported by stack draft to one of two electrostatic treater units, which was energized to allow collection of particulates.

Railroad cars of flue dust were transferred to the fine ore bins (a covered ore bedding area) for unloading by crane. This material was then roasted in the arsenic plant for recovery as arsenic trioxide.

2. Exit Flues

Dust in the exit flues from No. 1 and No. 2 plate treaters, as well as dust at the base of the stack, was removed using small front end loaders and hand shovels. During removal of dust in the No. 1 exit flue chamber, the opening to the main stack was blanked off to prevent dust from being pulled into this area by stack draft. An elaborate enclosure was constructed over the top of the flue, so that brick arches which posed a safety hazard to employees in the flue could be dropped into the chamber. Based on visual observation, the enclosure effectively contained fugitive emissions from this operation. Through openings in the side of the flue, dust and bricks from the arch were transported by front end loader to a belt conveyor located inside the No. 2 plate treater building. Material travelled the length of the building to a drop point in the No. 2 brick flue, where material could be removed using the scraper. Dust and brick were subsequently roasted in the arsenic plant after brick was crushed at a crushing plant located on site.

Dust in the No. 2 exit flue was removed and handled in a similar fashion except that an enclosure was not necessary, since the brick arches were already covered with steel plates. To prevent stack emissions while removing dust at the base of the stack, an "umbrella" was first constructed in the interior of the stack. Following demolition of the No. 1 exit flue, the opening at the base of the stack from this exit flue will be permanently sealed.

3. Cottrell Hoppers and Dust Conveying Systems

Collection hoppers and dust conveying systems are located in the basement of each treater building. These were used for collection of dust from the Cottrell electrostatic precipitators and transferred to one of four storage silos. As part of the preliminary work, all hoppers and dust conveying systems were emptied and cleaned, and the dust was processed in the arsenic plant.

4. Cottrell Buildings

All three Cottrell buildings were cleaned to remove as much dust as possible prior to demolition. This included removal of remaining dust in the treaters by using plant air to blow dust into collection hoppers in the basement of each building. Dust was then removed from the hoppers in an enclosed screw conveying system. Settled dust was also cleaned from the floors and walkways in the area.

Where possible, water will also be used to clean components in the Cottrell buildings. Water generated during this process will be collected in an enclosed concrete foundation area at the base of each building, and drained to an evaporation system at the plant designed to handle contaminated process water and storm water. (Section III of this plan provides further detail on surface water management and the evaporation system).

5. Storage Silos

The four storage silos and associated dust conveying systems were used to store dust removed from the electrostatic treater units. All such silos and conveyance systems have been emptied. To ensure complete evacuation, all hoppers, including pressure pots, have been opened and inspected.

6. Arsenic Plant

Except for the arsenic trioxide loading area, all accessible structures in the arsenic plant area, including roofs, beams, cross members, and floors, have been vacuumed. The arsenic trioxide loading area will be cleaned once its use is discontinued.

Vacuuming was accomplished using a commercial vacuum truck specifically designed to clean settled dust from surfaces in industrial applications. The truck was equipped with cloth filter bags mounted in a collection hopper, such that vacuumed dust was entrained in the bags. During the period of operation, the truck was parked in a stationary location near the arsenic plant. A series of flexible hoses were attached to the collection hopper, allowing operators to gain access to various areas of the arsenic plant. Dust was emptied periodically from the truck and deposited in the fine ore bins for shipment to the East Helena Plant for recovery of metal values. After vacuuming was completed, the inside of the truck was thoroughly cleaned before the vehicle left the plant premises.

More specific preliminary cleaning operations will include the following:

1. In addition to cleaning the stalls in the arsenic kitchens, drag conveyors and exterior ductwork will be cleaned and removed. The "top-flue," a short brick flue extending from the north kitchen to the No. 1 brick flue, has been cleaned of settled dust using a hoist and a scraper.

2. Godfrey roaster decks have been scraped to remove excess feed material before being cleaned of settled dust.

3. Charge bins and the zig-zag blender in the bunker building have been emptied and cleaned of all feed material. The two small baghouses have been cleaned and will be removed to storage for reuse at another facility.

4. All steel dust transfer systems in the arsenic trioxide storage area, including screw conveyors, bucket elevators, screens, hammermill, and weigh hoppers, will be emptied and cleaned of surface dust.

In all cases where water washing is used to remove dust, water will be collected and directed to a concrete basin for pumping to the waste water evaporation system. (As noted previously, Section III of this plan provides further detail on the drainage system on site).

B. CLEANUP OF COLLAPSED BRICK FLUES

During the summer of 1985, after copper smelting operations had ceased at the ASARCO plant, a portion of No. 1 and No. 2 brick flues collapsed (see Figure 1). It is possible that the deteriorating structures were weakened further by the flue pulling conducted in preparation for demolition. The collapse resulted in a pile of rubble, consisting primarily of brick, but also containing concrete, steel, wood and flue dust mixed with soil. Several walls and a steel crossover flue immediately adjacent to the collapsed flue sections were also in danger of collapse.

Following the collapse, ASARCO took a number of steps to ensure the safety of employees working in the collapse area and to prevent dispersion of flue dust by wind or surface water runoff. With the permission of the Town of Ruston, unstable structures adjacent to the flue sections, including the steel crossover flue, were removed. All rubble was removed using front end loaders and dump trucks. The material was transported to either the fine ore bins or a converter aisle located on plant property for temporary storage until it could be analyzed for toxicity and a method of disposal determined. The storage areas were covered and protected so the materials were not subject to surface water runoff or wind dispersion.

After clean-up, the collapse area was graded, with approximately the top three feet of soil removed and added to rubble stored at the plant. The entire area of collapse was then covered with heavy plastic material, which was securely anchored, to ensure that rainfall and subsequent surface water runoff would not come into contact with the exposed area. This plastic cover will be maintained until the demolition of adjacent structures begins.

Based on an analysis of brick rubble using the Extraction Procedure (EP) Toxicity Test, the rubble in temporary storage was designated as dangerous waste due to concentrations of arsenic and cadmium. After a contract was executed with Chem-Security Systems, the material was transported to its fully permitted hazardous waste disposal site in Arlington, Oregon. It is estimated that approximately 2,200 tons of this material was removed from the site.

Because the flue collapse occurred before all flue dust could be removed from the brick flue system, some flue dust still remains. Due to the structural instability of the remaining flues, it is not possible to conduct any further cleaning. Therefore, this dust will have to be removed at the time of demolition.

C. ASBESTOS REMOVAL

Asbestos-bearing materials such as wall and pipe insulation will be removed from buildings prior to demolition in areas where EPA's and ASARCO's OSC agree that such removal is practicable. ASARCO has identified areas where insulation is known to be present, and has determined by laboratory analysis, where necessary, whether the material contains asbestos fibers. A list of such areas is attached as Appendix B.

Before removal of asbestos begins, most work areas will be shrouded in plastic to prevent dispersal of any asbestos fibers to the atmosphere. As necessary, an air filtration system will be used to remove workroom air as the project is being conducted. The air filtration system will consist of a rough filter followed by a HEPA Filter or equivalent for final filtration. As asbestos is removed, it will be thoroughly wetted with water and a wetting agent. After removal, the material will be packed in double-lined EPA/WISHA-approved plastic bags and delivered to an appropriate landfill in accordance with EPA and PSAPCA regulations.

To comply with regional, state and federal regulations, adequate notification will be provided to PSAPCA and WISHA prior to conducting any asbestos removal activities. Any contractor performing asbestos removal will be certified to conduct such work through a state-approved training program. Waste disposal authorization will be obtained from the appropriate county health department so that landfill operators can be prepared to cover waste with non-asbestos containing soil within 24 hours.

D. REUSABLE EQUIPMENT

Reusable items of equipment in the structures to be demolished will be removed and retained in storage for subsequent sale or for use in another ASARCO facility. This includes certain electrical transformers, motor control center equipment, stack heater equipment, instrumentation, etc. Section III provides more specific information on the reusable equipment associated with each facility to be demolished.

Before reusable equipment is placed in storage, excess dust will be removed using such techniques as wiping, scraping, and vacuuming. Equipment that can be water washed will be placed on a rack over the concrete basin and cleaned with a high pressure water spray. The storage area for reusable equipment will be a clean area on site not exposed to contaminated demolition materials. Such reusable equipment may then be shipped off site for use in similar industries.

E. DISCONNECTION OF UTILITIES

The following steps have been taken or are planned to disconnect utilities prior to demolition:

1. All D.C. power was turned off at the transformers after completion of flue pulling and other clean-up activities. Before demolition, all electrical switchgear and equipment will be removed.

2. The natural gas lines were purged and certain water lines drained. To accomplish this, air was introduced at the main headers and branches at the ends of the lines were opened. Water will remain in some areas to aid in dust control.

3. Air lines were disconnected except those that will be needed in some areas during demolition and cleanup.

F. REMOVAL OF PCB EQUIPMENT

As of May 1, 1986, all equipment containing polychlorinated biphenyls (PCB) has been removed from the site and disposed of in accordance with EPA regulations. There is no PCB-containing equipment on-site at this time.

III. SITE STABILIZATION WORK

As shown in Figure 1, the first priority in demolition will be given to removal of the easternmost portions of the brick flues. This is an overhead portion and its structural instability poses a safety hazard to truck operators and other workers who must pass underneath. After the overhead portion is removed, the remaining portion of No. 1 and No. 2 brick flues will also be demolished. The contractor will then work from the top of the hillside down, removing the plate and pipe treater buildings first, followed by the facilities associated with the arsenic plant.

This section describes the steps that will be taken to demolish each structure. Particular attention is given to necessary environmental controls. Disposal of the various types of materials generated is mentioned only briefly, with further detail provided in Section IV.

Throughout the discussion of demolition work, reference is made to the use of high pressure water fogging nozzles to reduce the possibility of fugitive dust emissions. Before demolition begins in a given area, water fogging nozzles will be mobilized in that area at locations where they would be expected to be most effective in dust control. Other dust control methods were considered, such as the use of wetting agents and polymers. However, these methods are more suitable for controlling dust from exposed surfaces that are to remain undisturbed. During demolition, new surfaces will be continually exposed and disturbed. Furthermore, ASARCO has used wetting agents in the past in connection with the handling of feedstocks and found them to be no more effective than water.

Some of the structures to be demolished, such as the storage silos and the cottrell powerhouse and changehouse, have concrete floors or slabs. Any concrete floors and slabs remaining after demolition of structures will be left in place pending the results of the RI/FS.

A. PLATE AND PIPE TREATER BUILDINGS

Demolition of the three treater buildings will begin by removing the roofs to gain access to the interior steel and plates or pipes associated witn the treater units. Although preliminary activities included removal of dust, other dust may be encountered during the course of dismantling the buildings. If this occurs, the affected area will be thoroughly hosed with high pressure water fogging nozzles prior to further demolition to reduce the possibility of fugitive dust emissions.

Water used in the dust suppression program will be captured and collected in the foundation of each treater building. The foundation of each building consists of at least a concrete slab floor, which is capable of retaining water. Prior to demolition, each foundation will be inspected to ensure that a continuous concrete wall at least one foot high is in place around the perimeter of the floor area and that there are no leaks or cracks. A lined sump will be installed at a low point in one end of each building. This will allow water to be pumped through PVC lines to the existing drainage system in the arsenic plant or to concrete sumps northeast of the No. 3 boiler building (Figure 2). From these locations, water will be pumped to the waste water evaporation system at the north end of the plant, as discussed in Section III.C. Appendix A provides detailed information on the operation of this system.

All screw conveyors, drives and other mechanical_items associated with the treater buildings will be removed. The reusable drive items will be cleaned, segregated and placed into storage (see Section II.D). The remainder of the mechanical items will be cut up and scrapped in accordance with Section IV.A.2. Any reusable electrical items will be removed and stored. After removal of the screw conveyors, the dust conveyors and steel flues will be cut up and disposition will be determined in accordance with Section IV.A.2. Plates, hotframes, cold frames, wires, insulators, dampers, cell wall sheets and miscellaneous

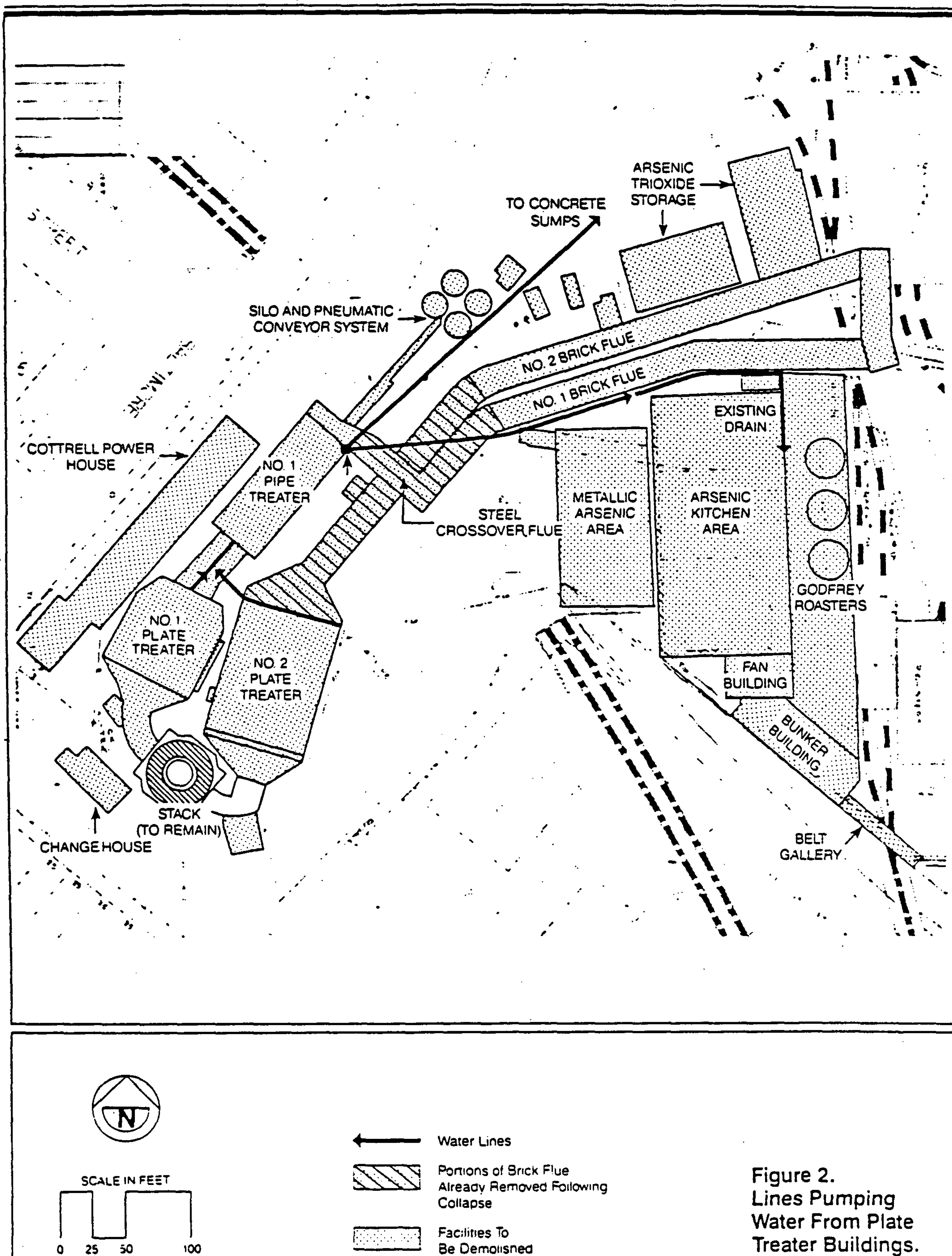


Figure 2.
Lines Pumping Water From Plate Treater Buildings.

items will be removed and disposition will be determined in accordance with Section IV.A.2.

The exterior walls of the treater buildings will be demolished as necessary to gain access to the steel inside. During the demolition of the walls, dust emissions will be controlled by water spray as discussed at the beginning of this section. All interior wood (floors, supports, beams, etc.) will be removed and lowered with cranes to trucks for transfer to the converter for incineration, as discussed in Section IV.

It is possible that interior surfaces of the brick portion of this building can be cleaned using high pressure water. This would be conducted prior to demolition of the brick walls. Water generated from this operation would be collected in the basement of the building, and pumped to the waste water evaporation system. After cleaning, the walls will be demolished. The brick will be disposed of in accordance with Section IV.A.3.

B. SILOS AND PNEUMATIC CONVEYING SYSTEM

All insulation on the four silos will be removed for appropriate disposal. Because this material is a urethane type foam, precautions used for asbestos removal will not be necessary. Following removal of insulation, the silos will be transported with a crane to a specified location at the plant. The pneumatic pressure pots and associated control equipment will be emptied, cleaned out and removed. Silos and pressure pot equipment will be stored in a safe place for possible future use at another plant location.

The steel feed conveyor structure between the Cottrells and the storage silos will be emptied, cut up, and disposed of in accordance with Section IV.A.2. The stairways, access platforms, and steel support structure over and around the four silos will be dismantled, cut up, and disposed of in accordance with Section IV.A.2. Fiberglass roofing can either be reused at the plant or cut up for appropriate disposal.

After removal of all structures, extraneous debris in the area will be removed and the entire area will be vacuumed and/or swept to assure that contaminated materials are not left exposed to the elements.

C. NO. 1 AND NO. 2 BRICK FLUES

The roof and wooden support beams over the brick flues will be removed after cleaning. As the material is removed, it will be slid down temporary chutes to trucks for transport to the converter for incineration (See Section IV). Service piping will also be dismantled.

Portions of the converter secondary hooding flue were determined to be suitable for reuse, and were removed by a contractor. The remaining portions of the secondary hooding flue and anode vent flue resting on the brick flues will be dismantled. Fiberglass insulation on the anode flue will be removed and, after authorization by the appropriate county health department, will be transported to a regulated, approved landfill for disposal. The secondary hooding flue fan will be prepared for shipment to another plant, while the anode flue and steel supports will be scrapped.

After removal of extraneous structures, the remaining sections of the brick flues will be demolished. An attempt will be made to drop the brick walls inward. Steel "A" frame supports for the flues will be removed and disposed of in accordance with Section IV.A.2. Concrete "A" frame wall supports and foundations will be demolished and disposed of in accordance with Section IV.A.3.

To minimize the potential for fugitive dust emissions, high pressure water fogging nozzles will be used throughout the operation. Before knocking down the walls, all exposed brick surfaces in the section to be demolished will be thoroughly wetted. As each wall section is caved in, additional water will be used to wet other surfaces that are exposed. Water used in the dust suppression program will be collected and directed to the waste water evaporation system.

As shown in Figure 3, water entering the brick flues will flow by gravity to the passageway between the arsenic trioxide storage area and waste heat boiler area. At this point, water will enter subsurface drains that flow past the Godfrey roaster area and enter a collection box located near the south end of the Herreshoff roaster building. Water in the collection box will flow by gravity to the concrete basin south of the acid plant for pumping to the waste water evaporation system (see Appendix A). Water entering areas southeast of the No. 1 brick flue and between No. 1 and No. 2 brick flues will flow to similar drains that proceed past the Godfrey roasters to the concrete basin.

Water draining from the northwest side of No. 2 brick flue will either flow into drains extending past the Godfrey roasters or enter drains that proceed north along the arsenic trioxide storage area and No. 3 boiler building. All drains are located immediately below the ground surface, with catch basins at various points for surface water collection. Surface water will flow through the drains into above-ground lines at the northeast end of the No. 3 boiler building, then continue downslope to one of two concrete sumps. From the concrete sumps, the water will be pumped through PVC lines directly to the waste water evaporation system.

The water collection system shown in Figure 3 and described above was inspected by EPA and other agencies to determine system integrity. ASARCO will take the following measures recommended by EPA to ensure that the drainage system is functioning properly:

- Prior to demolition of each discrete building or unit, the EPA OSC will approve the water collection system serving that

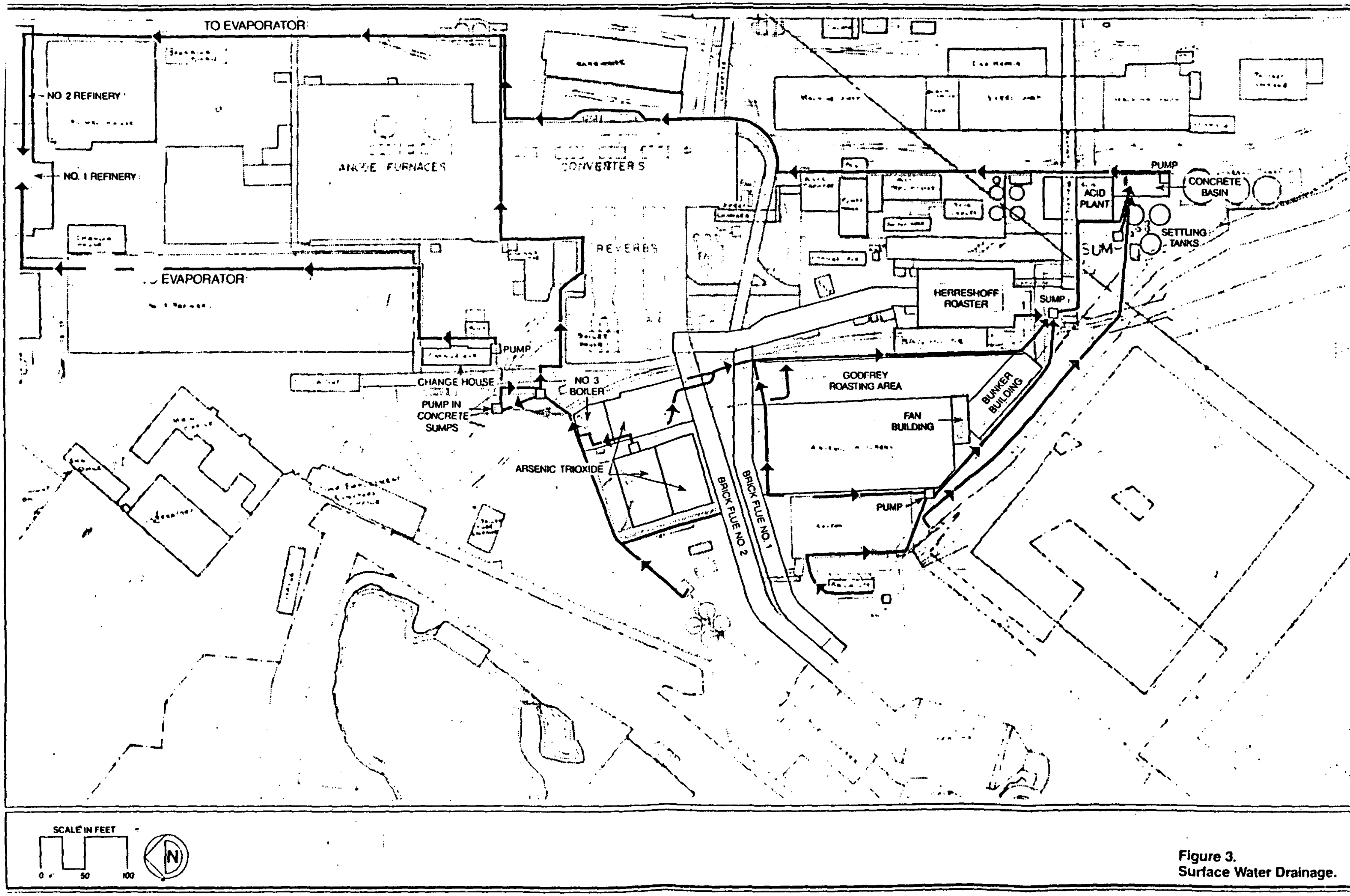


Figure 3.
Surface Water Drainage.

building or unit as well as the amount and method of precleaning necessary.

- Prior to demolition of the treater buildings, the one-foot-diameter PVC line draining the plastic tarp covering the soil beneath the collapsed flues shall be rerouted so that it flows to the evaporation system rather than an outfall.

- The large underground storm drain located to the north of the Godfrey roasters shall be tested for leakage prior to its use for waste water flow in connection with the demolition work by measuring the water level decline in the open concrete sump into which the drainpipe empties. The volumetric loss from the sump will be measured over a 24-hour, precipitation-free period.

D. COTTRELL POWERHOUSE AND CHANGEHOUSE

All internal components in both buildings will be removed, and will either be scrapped or salvaged. The wooden roofs will be cut up and dropped to the floor, and brick walls will be demolished. Both structures are constructed of brick materials. Brick demolition debris will be disposed of in accordance with Section IV.A.3.

E. ARSENIC PLANT

1. Roof and Supporting Structure

The roof over the metallic arsenic and Godfrey roasting areas consists of three sections, which rest upon one another and upon structures beneath. For this reason, the entire roof structure must be removed prior to dismantling of other major structures, such as the kitchens. Also, to prevent collapse of the entire roof structure, the three sections must be removed in the proper sequence. The roof over the metallic arsenic plant would be removed first, followed by the roof structure over the arsenic kitchens. Because the roof over the Godfrey roasting area supports the other two roof structures, it would be removed last. The roof and supporting structures over the bunker building and fan building at the south end of the arsenic plant, and the roof over the arsenic trioxide storage bins at the north end of the plant, would be removed separately.

Roof sections over the metallic arsenic plant, arsenic kitchens and arsenic trioxide storage bins are constructed primarily of wood. These will be removed in sections, and lowered to trucks for transport to the converter for incineration (see Section IV).

Roof sections over the Godfrey roasting area, bunker building and fan building consist of steel support beams covered by transite sheets or corrugated steel siding. Transite sheets contain asbestos fibers bonded in a non-friable state within the material. As they are removed, sheets will be transferred to the concrete basin to wash any surface dust from the pieces. The transite sheets will be removed by a licensed asbestos contractor, and, after washing, will require proper disposal as asbestos containing materials. Steel siding and support beams will be cut up and disposed of in accordance with Section IV.A.2.

2. Metallic Arsenic Plant

The two metallic arsenic furnaces and associated equipment have been sold and shipped to another facility. This equipment includes instrumentation located in the concrete block control room. After cleaning, the concrete block control room will be demolished. The method of disposal for the concrete will be determined by sampling and testing in accordance with procedures discussed in Section IV.

The metallic arsenic baghouse, fan, and other associated equipment have been vacuumed clean and shipped for use at another facility.

3. Godfrey Roasting Area

After preliminary cleaning of the roaster units (Section II), the small baghouse above each roaster feed hopper was removed and sold for use at another facility. Steel components, such as feed hoppers, decks, steel shell, gears and radiating flue will be cut up and disposed of as outlined in Section IV.

Brick arches, base and cement components will be removed from the arsenic plant area and transported to a CERCLA-approved hazardous waste disposal facility, or if immediate transportation is not practicable, it will be stored in the fine ore bins (a covered and protected area) until appropriate arrangements can be made for disposal at such a facility.

The water-cooled screw conveyors and pneumatic conveying system will be cleaned and stored for use at another facility. Other associated screw conveying systems in the area will be cut up for disposal in accordance with Section IV.A.2, as will the overhead feed conveyor system. Two large cylindrical steel storage silos located immediately south of the Godfrey roasters were emptied as part of the preliminary work (Section II). Sections of the silos will be cut into manageable pieces and disposed of in accordance with procedures described in Section IV.

4. Arsenic Kitchens

The arsenic kitchens are constructed of brick and concrete. Demolition will take place after the preliminary cleaning described in Section II. High pressure water fogging nozzles will be used throughout the operation to minimize the potential for fugitive dust emissions. Excess water will be collected in a subsurface drain line located immediately east of the Godfrey roasting area. This line will feed by gravity to the concrete basin for pumping to the waste water evaporation system. Disposition of materials from the arsenic kitchens will be in accordance with Section IV. It is anticipated, however, that due to the long term contact with arsenical dusts, much of the material will be designated as dangerous waste without the need for testing.

After dust removal (Section II), the top flue extending from the north kitchen to the No. 1 brick flue will be demolished. Dust suppression techniques as described for No. 1 and No. 2 brick flues will be used as needed during demolition. Any surface water runoff produced will drain through the arsenic plant to the drainage system east of the Godfrey roasting area. Bricks will be sampled and tested to determine the method of disposal (Section IV) unless it is determined at the outset that they are so contaminated as to necessarily constitute dangerous waste, in which case they will be disposed of as such.

5. Fan Building

Equipment and structures in the fan building were primarily associated with operation of the Herreshoff roaster baghouse. All ductwork, fans and instrumentation for the motor control center will be removed and stored for use at another facility. The small block building for the motor control center will be demolished using a bulldozer.

6. Bunker Building

Equipment and structures in the bunker building consist of charge bins and associated equipment used to store feed material for the arsenic plant. As discussed in Section II, this equipment was emptied and cleaned as part of the preliminary work.

There are four floor levels in this building. Demolition will proceed from the top floor level to the ground. The section of belt gallery which extends across the alley between the arsenic plant and Herreshoff roaster building will be removed, since it is supported by the bunker building. Constructed primarily of steel, it will be cut into manageable pieces for disposal in accordance with Section IV.A.2.

Equipment on the top floor of the building, such as the bunker break room, zig-zag blender and surge hoppers, will be cut up for scrap steel and disposed of in accordance with Section IV.A.2. Charge bins, feed belt systems, ductwork and the Wheelabrator baghouse located on lower floors will be dismantled, cut up for scrap steel and disposed of in accordance with Section IV.A.2. Wood located in this area will be removed and disposed of in accordance with Section IV.A.1.

The concrete block break room on the lower floor will be demolished and the rubble disposed of in accordance with Section IV.A.3. Certain support beams will be left intact to provide support for the tail gas flue which extends the length of the building at the far south end.

7. Arsenic Trioxide Storage Area

All steel dust transfer systems (screw conveyors, bucket elevators, screens, hammermill, weigh hoppers, etc.), which were emptied and cleaned as part of preliminary work, will be cut up and disposed of in accordance with Section IV.A.2. The barreling hopper and loading system will be treated in a similar manner.

Remaining wood storage bins include a 500-ton bin, 4,000-ton bin, and 9,000-ton bin. Each structure will be emptied of arsenic trioxide prior to demolition. The storage bins will be removed in sections for disposal in accordance with Section IV.A.1.

As the wood removed, high pressure water fogging nozzles will be used immediately prior to each step to reduce the potential for fugitive dust emissions. Water used in the dust suppression program will be captured and collected within the foundation of each storage bin. The foundations consist of a concrete floor surrounded by a continuous wall of concrete, which will not be demolished. From this point, water will be pumped to a collection point for the waste water evaporation system.

The baghouse located between the north kitchen and No. 1 brick flue will be vacuumed, with fans and other auxiliary equipment salvaged for reuse at another facility. The steel shell of the baghouse will either be salvaged for reuse or dismantled by cutting it up into manageable pieces for disposal in accordance with Section IV.A.2.

IV. SAMPLING AND DISPOSAL OF MATERIALS

A. DEMOLITION MATERIALS

Materials generated during the demolition process will consist primarily of wood, steel and masonry brick. Rough estimates indicate that about 866 tons of wood will be generated from the treater buildings and 1,658 tons from the arsenic plant. About 2,200 tons of brick rubble was disposed of following collapse of a portion of No. 1 and No. 2 brick flues (see Section II. B). It is estimated that an additional 3,800 tons of brick will result from demolition of the remaining brick flues and the treater buildings, while an estimated 6,480 tons of brick and concrete will be generated from the arsenic plant. No estimates have been made of the amount of steel that will be generated during demolition.

The following sections describe methods for sampling, transport and disposal of the various demolition materials. In some cases, materials awaiting transport and disposal will be stored in the fine ore bins on site. To prevent cross-contamination, one or two ore bins will be designated for the storage of materials which appear to be not contaminated, pending the results of testing. The remaining bins will be used to store contaminated materials.

If materials are tested to determine their disposition, the test results will accompany the shipment to its destination. In cases where the destination is a regulated, approved landfill for non-hazardous materials, prior to transportation appropriate testing will be conducted (including EP toxicity testing, if required), and test results will be discussed with the county health department having jurisdiction over the landfill. Materials will not be transported until any necessary waste disposal authorization has been obtained. Off-site disposal of hazardous materials shall comply with the EPA Off-Site Policy in accordance with Section XVI of the Administrative Order on Consent.

1. <u>Wood</u>

ASARCO shall select one of the following options for disposing of wood demolition materials (for purposes of this discussion, the term "wood" shall include timber, roofing, and other combustible materials):

1. Any wood generated during demolition can be disposed of by:

   a. Incinerating it in a former production vessel called a converter. Particulates from the incineration process will be collected by an electrostatic precipitator located at the acid plant (see further discussion of the incineration process following this list). Incineration will substantially reduce the volume of material requiring transport and disposal. The residual ash will be shipped to ASARCO's East Helena lead smelter for recovery of metal values. No testing of combustible materials will be required if this option is selected.

   b. Transporting it to a CERCLA-approved hazardous waste disposal facility. If this option is selected, testing will be conducted only to the extent necessary to meet the requirements of the disposal facility.

2. If ASARCO wishes to ship any wood off site other than as described in 1b above, it must be tested to ensure that it is sufficiently clean for the intended use or disposal method. Testing will be conducted using the EP-toxicity test on representative samples of the combustible materials in question.

If option 1a is selected, timber, roofing and other similar combustible items will be delivered by a wrecking contractor to an area near the converter for immediate incineration. The maximum size of combustible items will be 4' by 8' by 1'. If the material cannot be burned immediately, it will either be stored under cover in the converter aisle,or in the fine ore bins, which are also covered. Material will be loaded onto trucks, which can be covered with tarps if necessary.

No. 1 converter will be used for incineration. Chunks of wood will be loaded into boats or skips so that the material can easily slide from the container into the converter. Gas burners will be used to ignite the wood and maintain combustion. As one load of wood is reduced to ash, another load will be added. During incineration, exhaust gases and fugitive emissions will be captured by the primary hood ventilation system and transported to the acid plant spray chamber and the acid plant electrostatic precipitator for particulate collection.

To make this plan operational, a bypass flue once used during converter operations to direct a certain portion of gases to the No. 2 brick flue will be blanked off (Figure 4). This will result in all gases from the wood burning operation entering the acid plant electrostatic precipitator. The intermediate acid plant fan will pull vent gases through the electrostatic precipitator to a series of flues leading to the tail gas flue. This flue will transport exhaust gases to a point near the base of the main stack. Exhaust gases will enter the main stack at that point and exit out the top of the main stack.

To ensure that use of the No. 1 converter for incineration of wood and other combustibles will not result in excessive emissions, a performance test will be conducted. The performance test will determine the amount and constituents of gas and particulate matter emissions downstream from the electrostatic precipitator. If agreed-to performance standards are not met, the No. 1 converter will not be used as a wood waste incinerator, and one of the alternative disposal methods described in this section will be used.

If the performance of the No. 1 converter meets agreed-to specifications during the performance test, it will be used for the incineration of

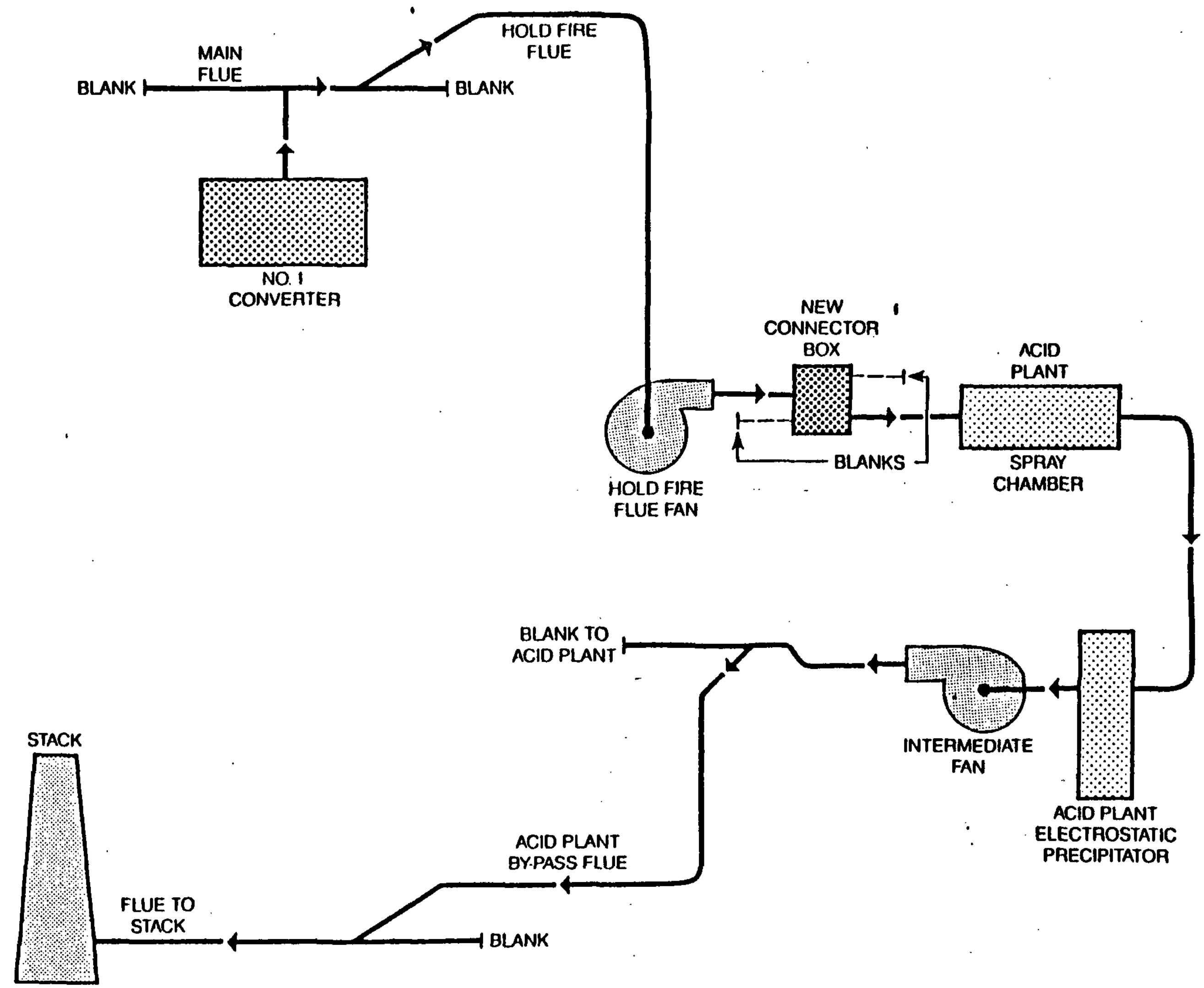


Figure 4.
Diagram of Converter Operation and By-Pass to Stack.

wood and other combustibles. The performance of the system will continue to be monitored during operation. Performance standards to be met during operation will be as set forth in Appendix C. All emissions in excess of agreed-to standards shall be reported immediately to EPA's OSC, who will confer with ASARCO's OSC regarding the necessary corrective action to take.

2. Steel

ASARCO shall select one of the following options for disposing of steel demolition materials:

1. Any steel generated during demolition can be disposed of by:

   a. Transporting it to a CERCLA-approved hazardous waste disposal facility. If this option is selected, testing will be conducted only to the extent necessary to meet the requirements of the disposal facility.

   c. Cutting it up into pieces no larger than 18 inches per side and depositing it in railcars for shipment to ASARCO's East Helena smelter for use in the lead blast furnace. Such use would constitute a beneficial reuse of the material, since scrap iron must be purchased on the open market for use in this step of the lead smelting process. No testing of steel will be required if this option is selected.

If options a or b are implemented immediately upon demolition, no cleaning of the steel will be required. If the steel is to be placed in storage pending disposal, the EPA OSC shall determine whether cleaning is necessary based on the degree of visible contamination and the length of time to be stored.

2. Steel that shows no visible signs of contamination can be collected in batches without testing and shipped to a scrap dealer or industry that has the capability to process the steel by smelting. To verify that steel shipped by the Tacoma Plant is accepted as a batch for batch processing, a form will be developed that is mutually acceptable to EPA's and ASARCO's OSC. The verification procedure will be similar to that used for shipments to ASARCO's East Helena Plant, as described in Section IV.D.

3. If ASARCO wishes to ship any steel off site other than as described in 1 and 2 above, the steel must be swab tested to ensure that it is sufficiently clean for the intended use or disposal method. Steel that is determined by swab testing to have unacceptable levels of contamination will be cleaned using a high pressure water blast or other method (such as sandblasting), and retested. Cleaning shall be conducted in such a way that no visible emissions are produced.

3. <u>Brick and Concrete</u>

ASARCO shall select one of the following options for disposing of brick and concrete demolition materials:

1. Any brick or concrete generated during demolition can be disposed of by transporting it to a CERCLA-approved hazardous waste disposal facility. If this option is selected, testing will be conducted only to the extent necessary to meet the requirements of the disposal facility.

2. If ASARCO wishes to ship brick and concrete off site other than as described above, it must be tested to ensure that it is sufficiently clean for the intended use or disposal method. Brick and concrete associated with the cottrell powerhouse and changehouse would not be expected to be contaminated, because surfaces were not historically

waste disposal facility. If this option is selected, testing will be conducted only to the extent necessary to meet the requirements of the disposal facility.

2. If ASARCO wishes to ship miscellaneous materials off site other than as described above, these materials must be tested to ensure that they are sufficiently clean for the intended use or disposal method. Testing will be conducted using the EP toxicity test on representative samples of the miscellaneous materials in question.

B. SOILS

Soils beneath the brick flues and other structures may be contaminated with process materials. Sampling and analysis of the soils will be conducted in accordance with the sampling plan. Temporary precautions, such as covering exposed soils, will be taken pending the results of the analyses. Disposition of soil will be determined in accordance with the RI/FS.

C. EVAPORATION SYSTEM RESIDUE

Residue that accumulates in the waste water evaporation system will be shipped to ASARCO's lead smelter in East Helena, Montana, for recovery of metal values. Shipment will be in covered railroad cars or metal drums. The handling of residue from the waste water evaporation system prior to shipment is described in Appendix A.

D. TRACKING OF MATERIALS TO BE RECLAIMED BY ASARCO

Certain materials described above will be shipped to ASARCO's East Helena lead smelter for recovery of metal values. These include scrap steel, incinerator ash and evaporation system residue. To verify that materials shipped from the Tacoma Plant are accepted for reclamation at East Helena, a form shall accompany the straight bill of lading that describes the shipment (including the type of material and the location on site from which it was removed), identifies the shipment number, and provides the total weight in pounds of the shipment. This form will be signed by ASARCO's OSC or his designated representative prior to shipment from Tacoma. Upon arrival at the East Helena Plant, the departmental superintendent or his designated representative shall also sign the form, acknowledging that the shipment has been received at the plant.

V. HEALTH AND SAFETY

Subsections A and B below describe general procedures that will be followed during demolition to ensure worker health and safety. The Health and Safety Plan to be developed as one of the first tasks of the RI/FS will specify more specific procedures.

A. INDUSTRIAL HYGIENE

Workers involved in demolition and disposal of materials may at times be exposed to levels of inorganic arsenic or lead above prescribed WISHA standards, particularly when working in enclosed areas. In areas where there is a potential for such exposure, ASARCO will require that workers wear suitable protective equipment, such as respirators, protective coveralls, and gloves. Workers in these areas will also be required to shower and change clothing at the end of each work shift. ASARCO will provide changeroom facilities for this purpose.

ASARCO will inform any contractor or subcontractor working in areas scheduled for demolition of the health hazards associated with exposure to arsenic, lead and asbestos, and will provide written instructional materials. The contractor will be required to provide such information to all employees under its supervision. The contractor will also have to agree to other industrial hygiene procedures deemed appropriate by ASARCO, including:

1. Requiring each of its employees and employees of subcontractors to fully comply with all WISHA regulations, which may include the wearing of approved respirators and protective clothing; and

2. Permitting ASARCO to obtain biological or personal air samples from its employees for purposes of monitoring exposure levels to arsenic or lead.

Task 8 - DETERMINATION OF NEED FOR REMEDIAL ACTION

This is the first task of the Feasibility Study. The FS will be performed for the smelter site only and will not address offshore areas. This applies to this and subsequent tasks (Tasks 8-14). Information collected from offshore areas during the RI will be provided to the EPA and/or their contractor who will perform the FS for that affected area.

This task will establish the need for remedial activities at the site and will provide a written justification of this need. The task will focus on the identification of each area of the smelter site that should be addressed by the Feasibility Study and will identify exposure pathways that are to be addressed by remedial alternatives. This task will also identify general response actions. This is a generalized description and will not identify specific technologies. Examples of general response actions include:

- No action
- Containment
- Pumping
- Collection
- Diversion
- Complete removal
- Partial Removal
- On-site Treatment
- Storage
- On-site disposal
- Off-site disposal
- Alternative drinking water supply
- Relocation of Receptors
- Other off-site measures

A project schedule showing this and subsequent tasks of the FS is included as Appendix A of this Project Work Plan. Specific technical areas to be addressed are discussed in more detail below:

8.1 Waste Management

OBJECTIVE: The objective of this subtask is to identify those waste materials remaining on-site that require off-site management.

APPROACH: This identification will be made based upon the waste treatment and disposal technologies available on-site, the results of designation testing performed during the Remedial Investigation, and the availability of other off-site waste management options such as recycling, or the use of materials (which may exhibit waste characteristics) as feedstock.

8.2 Groundwater

OBJECTIVE: The objective of this subtask is to identify impacts of the site upon groundwater resources and to identify where groundwater may be a major pathway for off-site migration of contaminants to potential receptors.

APPROACH: Groundwater data generated in Tasks 1 and 3 will be used to identify potential receptors. The receptors that will be evaluated include drinking water aquifers and Commencement Bay. Contaminant loadings to the receptors will be quantified, and the threat to human health and the environment will be assessed using available drinking and aquatic water quality criteria as well as the results of the aquatic and biological investigations (Task 3.7).

8.3 Surface Water

OBJECTIVE: The surface water assessment program will determine if on-site surface waters are a source of toxicants posing a threat to health and welfare or the environment. A determination of the necessity for control or treatment of surface waters will also be made.

APPROACH: The runoff of surface waters from the site will be quantified and evaluated for the major drainages on-site. Quantity and quality of surface runoff will be evaluated in terms of the necessity for control and/or further treatment. In this regard, the mass pollutant loading to receiving waters will be examined to determine the necessity and/or feasibility of containment. Recommendations will be presented on the need to conduct remedial actions regarding surface water quality and control. Such recommendations will be included as part of the overall determination of need for site remedial action.

8.4 Surficial Soils

OBJECTIVE: The objective of this subtask is to evaluate if surficial soils are significant contributors of contaminants migrating to potential sources. This task is closely linked to the evaluations of air quality, groundwater and surface water.

APPROACH: Surficial soils information collected in tasks 1 and 3 will be used to identify potential receptors. The findings of the air quality, groundwater or surface water investigations may identify particular areas where the soils are contributing to pathways that are impacting receptors. The effect of the implementation of the demolition plan will also be considered to determine the short-term or long-term changes to surficial soil conditions and their resulting effects upon air, groundwater and surface water. Surface soils will also be evaluated in terms of possible future site development.

8.5 Air Quality

OBJECTIVE: The air quality program must determine if there are current sources of toxic dust to the atmosphere which require remediation. In addition, the project team must consider the long-term potential for later release of airborne dust from the site containing toxic compounds.

APPROACH: The emissions from existing or future conditions under the "no-action" alternative will be quantified and evaluated for each of the major sources at the site. The techniques and analysis procedures used in this task are the same as those that will be used in the evaluation of the remedial action alternatives, the major air quality effort in the FS. The discussion of approach for this analysis is included in the APPROACH section of the air quality discussion for Task 12.

Ultimately, the air quality team will deliver as part of this task recommendations on the need to conduct remedial actions on the basis of any air quality concerns. These will be included in the overall determination of the need to conduct a remedial action.

Task 9 - PRELIMINARY REMEDIAL TECHNOLOGIES

Based upon the need for remedial activities identified in Task 8, a list of potential remedial technologies will be developed under this task. This list will be screened to eliminate or modify those remedial technologies which will be difficult to implement, require unreasonable time, or are based upon insufficiently developed technology. Screening will be coordinated with EPA staff. All alternatives considered will be listed and categorized according to reasons for elimination.

Information gathered during the RI will be used to help identify potential remedial technologies. In selecting remedial technologies, the site conditions, waste characteristics, and the level of technology development will be considered. In addition, the possible future site use will be considered and incorporated into our preliminary evaluations.

Task 10 - DEVELOPMENT OF ALTERNATIVES

Using the results of Tasks 8 and 9, a limited number of remedial alternatives for source control or remedial action will be developed. These will be based upon site-specific objectives determined from the public health and environmental concerns identified during the Remedial Investigation. The rationale for exclusion of any potential technologies identified in Task 9 and excluded during this task will be documented.

Feasible technologies will be reviewed to consider compatible or incompatibility between them. Combinations of several technologies will be considered and, in fact, probably will be ultimately used.

At a minimum, five alternatives will be evaluated including one from each of the following categories:

1. Treatment or disposal at an approved, off-site facility;
2. Alternatives which attain public health and environmental standards;
3. Alternatives which do not attain public health or environmental standards;
4. Alternatives which do not attain public health or environmental standards, but will reduce the likelihood of present or future threat from hazardous substances, and;
5. A no-action alternative.

Task 11 - INITIAL SCREENING OF ALTERNATIVES

This task's objective will be to eliminate those remedial alternatives that are clearly not feasible or not appropriate. Each remedial alternative identified under Task 10 will be screened based upon the effectiveness of the environmental protection achieved by the alternative, the environmental effects that may result from the alternative, the feasibility of the technology on which the alternative is based, and the relative cost of the alternative as opposed to other remedial alternatives under consideration.

The purpose of this task is to establish a list of carefully selected remedial alternatives for detailed evaluation under subsequent tasks. This task allows for the elimination or modification of the identified remedial alternatives.

Task 12 - EVALUATION OF ALTERNATIVES

Upon screening of alternatives, those remaining will be developed in more detail to allow an in-depth final evaluation. This in-depth description of each alternative will include the following analyses:

A. Technical Analysis,
B. Environmental Analysis,
C. Public Health Analysis,
D. Institutional Analysis,
E. Cost Analysis, and
F. Cost Effectiveness Analysis.

These analyses will be used as the basis for an objective evaluation of the Remedial Alternatives. The final evaluation will be based upon performance, reliability, implementability, and safety.

It is essential to identify those alternatives for which the *benefits outweigh the potential impacts of implementation.*

12.1 Technical Analysis

The Technical Analysis is to describe each Remedial Alternative in relation to:

- Treatment, storage and disposal technologies;
- Compliance with environmental programs,
- Operation maintenance and monitoring requirements;
- Review off-site facilities;
- Temporary storage requirements, off-site disposal needs, and transportation plans;
- Permanency of the solution;
- Health and safety considerations;
- Phasing of the remedial action;
- Segmentation of the remedial action;
- Special engineering and site preparation requirements.

A discussion of the technical analysis for the different technical disciplines follows:

12.1.1 Waste Management

OBJECTIVE: The objective of this subtask is to evaluate waste management alternatives. For on-site technologies, this includes an analysis of the effectiveness of the process to mitigate the risks posed by the presence of the waste. For off-site technologies, this may include a review of the operations of the facility designated to receive the waste in order to provide assurances that the waste, upon relocation does not generate a new threat to human health or the environment or substantially increase ASARCO's liability.

APPROACH: For on-site technologies, we will perform a complete engineering review of the proposed methodology and will review the effectiveness of the method at similar facilities. The review of on-site waste management processes will focus upon the reliability, safety and permanence of the process.

For off-site disposal or treatment, the review will focus upon the effectiveness of the proposed solution and the liability incurred by ASARCO. A review of ASARCO's liability will include a thorough review of the facility, the proposed process, the potential environmental liability of the process or the facility, and the regulatory status of the facility. This review may require site visits to the proposed facilities.

12.1.2 Groundwater

OBJECTIVE: The ability of each remedial alternative will be evaluated in relation to its ability to mitigate the adverse public health or environmental effects caused by contaminant migration via groundwater pathways.

APPROACH: Both passive and active remedial technologies will be considered. Passive remedial action components will likely include upgradient diversion of ground and surface waters, covers and physical barriers to flow (slurry wells). Active systems may include neutralization of acidic groundwaters and/or groundwater pumping. Appropriate analytical and numerical groundwater flow and transport models will be used to evaluate the effects of possible groundwater remedial actions.

12.1.3 Surface Water

OBJECTIVE: The surface water impacts of the recommended remedial action alternatives will be evaluated. For on-site surface waters, it is necessary to identify each alternative and the magnitude of control and benefits obtained from the proposed remedial action.

APPROACH: Alternative surface water controls and/or the need for additional treatment will be evaluated. The control or management of surface waters for each alternative will be scrutinized to determine the impacts of such control(s). In this regard, the surface water and groundwater evaluations will be closely coordinated since the two areas exert a great deal of influence over each other. Identification of alternative surface water controls will focus on regrading and rerouting of surface runoff in order to limit site contact and erosion. Risk assessment of surface waters will be conducted using data generated in the RI phase of the project and will necessarily address the potential for groundwater impacts for each alternative (evaluated more thoroughly in Task 12.1.2.) The relative effectiveness of each remedial alternative will be described. Finally, mitigation options will be identified and evaluated for each of the surface water remedial alternatives identified in the FS.

12.1.4 Soils

OBJECTIVE: The objective of this subtask is to evaluate the effects of each remedial alternative in terms of its impacts upon soils and those contaminant pathways in which soils play a significant role. The effects of remedial activities on soils directly affect the migration of contaminants into groundwater, surface water and the air. This subtask is closely related to the analyses to be performed for these disciplines.

APPROACH: For each alternative, the effects of that action upon potential control or mobilization of contaminants in the soil will be quantified. Evaluations will consider both impacts during implementation and long-term conditions. This information will be provided for the groundwater, surface water and air quality evaluations under this task. Remedial alternatives impacting soils may include erosion and surface water controls, removal of specific areas of contaminated soils, site regrading and capping, and in-situ treatment of contaminated soils (neutralization).

12.1.5 Air Quality

OBJECTIVE: The air quality impacts of each of the remedial action alternatives must be evaluated. In particular, it is essential to identify alternatives for which the air quality impacts outweigh the benefits to be obtained from the remedial action.

APPROACH: The air quality team will determine in meetings with the agencies during earlier phases of the project, the pollutants to consider in the evaluation. The specific criteria to be used in the evaluation of the pollutants will be defined in this task. Where standards are applicable, they will, of course, be used. Where standards are not applicable, TLV values will be determined, or risk assessment techniques will be used for carcinogenic pollutants.

The emissions of fugitive dust from all potential dust producing sources for each alternative will be identified and quantified in this task. Published emission factors will be used where available. Sources for emission factors include documents such as EPA's Document AP-42, and documents prepared by the States of Wyoming and Colorado on mining fugitive dust. For some sources of emission, it may be necessary to independently develop or estimate emission factors. In particular, the demolition of the structures is expected to fall in this category.

The completed emission inventory for each alternative will be used in an air quality modeling study to evaluate the impacts of the emissions in the surrounding area. The air quality models to be used will be determined in meetings with the agencies. The meteorological data to be used in the air quality modeling will be taken from the data base for the smelter. Agency approval of the meteorological data as well as other parameters of the air quality modeling (e.g. settling velocities, particle size classes, etc.) will be obtained. For some pollutants, the risk assessment will follow the air quality modeling. Risk assessment will be performed using the population information obtained and validated in the RI phase of the project and the air quality modeling results performed for the current task.

For each alternative, mitigation options will be identified and evaluated. Where possible, changes to the design of the alternative may be made to improve the air quality impacts predicted for the alternative. The air quality team will work closely with the other project team members to help in finalizing the recommendations for the final alternative selection.

12.2 Environmental Analysis

Although remedial actions taken in response to a 106 Order are generally exempt from the NEPA and SEPA requirements to prepare an environmental impact statement (EIS), this exemption assumes that the functional equivalent of a NEPA and SEPA review is carried out as part of the RI/FS. The environmental assessment (EA) performed under Task 12.2 will be designed to meet the need for NEPA and SEPA functional equivalency.

The EA will evaluate the beneficial and adverse effects of each remedial action alternative. If any alternative appears to have significant adverse effects, the EA will discuss the mitigation measures to be used in conjunction with that alternative. An integral part of the EA will be an evaluation of the no-action alternative, which will describe current site environmental conditions and the conditions anticipated if no remedial action is taken. The no action alternative will serve as the benchmark against which remedial action alternatives are compared.

It is anticipated that most of the information needed to prepare the EA will be developed during other tasks, including Tasks 1, 3, 11 and 12.1. Therefore, this task is primarily viewed as a compilation of already gathered information to allow a comparison of the beneficial and adverse environmental effects of remedial action alternatives.

12.3 Public Health Analysis

The Public Health Analysis will evaluate each remedial alternative in terms of public health impacts both during and after completion of the remedial action. The no-action alternative will be evaluated and will form the baseline for comparison to each of the remedial alternatives. Where criteria, standards, or guidelines are available, these will be incorporated into the comparison. In other cases, relative effectiveness of each alternative will be considered. Factors to be considered in the Public Health Analysis will include the nature of contaminants present, likely exposure concentrations, potential toxicologic consequences of public exposure to likely contaminant concentrations, and any other data pertinent to describing potential public health impacts associated with site activities. It is anticipated that much of the analysis will focus on the potential public health impacts of arsenic and other heavy metals contained in airborne suspended particulates resulting from site-related remedial activities. Remedial alternatives will also be evaluated with respect to relative impacts on water supplies, food sources, and other potential exposure points.

12.4 Institutional Analysis

The analysis conducted under this task will evaluate the effects of federal, state, and local standards and other institutional considerations on the design, operation, and timing of each alternative. The primary focus will be on the extent to which alternatives attain or exceed applicable federal environmental and public health standards, including regulatory programs under the Resource Conservation and Recovery Act (RCRA), the Safe Drinking Water Act, the Clean Water Act, and the Clean Air Act. The institutional analysis will also include an evaluation of the extent to which NEPA equivalency has been achieved through the EA (Task 12.2) and the community relations program (Task 7). Coordination with agencies other than EPA will be conducted as necessary to ensure that all applicable institutional requirements are considered.

12.5 Cost Analysis

Each alternative will be evaluated based upon a determination of the cost of implementation and the cost of operation and maintenance. Both monetary and non-monetary costs will be included. Costs will be presented as present-worth values. A distribution of costs over time will be presented.

12.6 Cost Effectiveness Analysis

This analysis will incorporate the results of each of the previously described analyses to determine the cost effectiveness of each remedial alternative.

Task 13 - PRELIMINARY FEASIBILITY STUDY REPORT

The Prèliminary Feasibility Study Report will summarize the findings of Tasks 8 to 12. The report will be submitted to both ASARCO and the EPA for their review. The Preliminary Feasibility Study Report will also undergo a public review process prior to development of the final report. This process is required as an alternative to the development of a NEPA Environmental Impact Statement. This public review process will be implemented as part of the Community Relations Plan.

Task 14 - FINAL FEASIBILITY STUDY REPORT

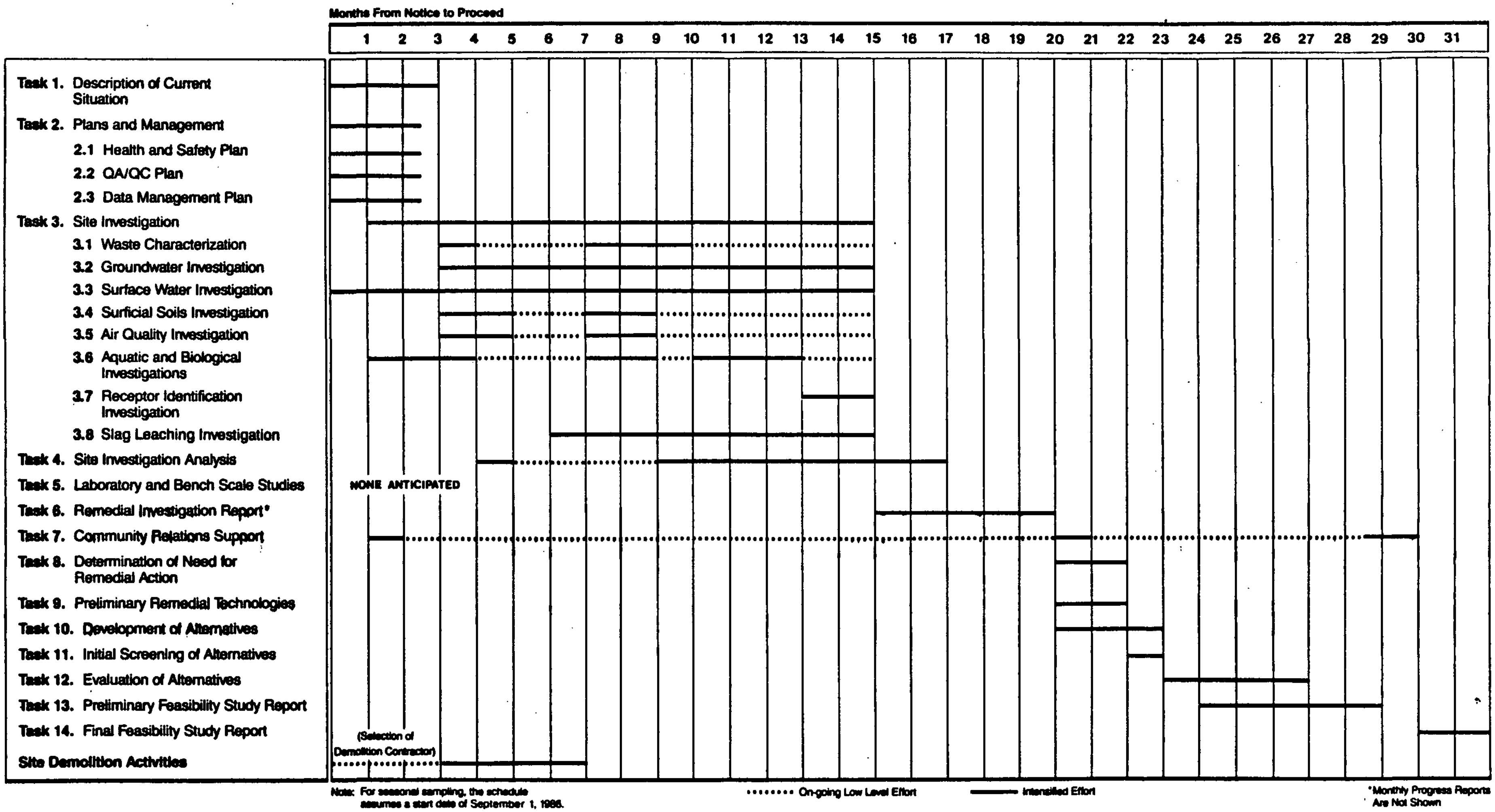
The Final Feasibility Study Report will incorporate the comments from ASARCO and the EPA on the preliminary report. It will also include a responsiveness summary on public comments received. In addition to the results described in the report, supplemental information will be presented in technical appendices to be attached to the report. The report will be provided to ASARCO and the EPA.

Appendix A - Project Schedule

The following page describes the proposed project schedule for implementation of this RI/FS Project Work Plan. A more detailed project schedule would be developed as part of the Management Plan to be developed in Task 2.

The assumed start date for this schedule is September 1, 1986. Since the field tasks require special timing to correspond to seasonal sampling opportunities, a delay in the start data could affect the duration upon the overall schedule.

Parametrix Team Schedule
for ASARCO Tacoma Smelter RI/FS



Appendix B - Technical Resource and Guidance Documents

This list of references includes pertinent Technical Resource Documents, Guidance Documents, and other references directly applicable to the development and implementation of the Quality Assurance/Quality Control Plan for the Remedial Investigation.

Biological Testing Methods. 1981. Hazardous Waste Section, Washington State Department of Ecology. DOE80-12.

Characterization of Hazardous Waste Sites: A Methods Manual. Volume I. Site Investigations. April 1985. U.S. Environmental Protection Agency guidance document.

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B. SAFETY PRACTICES

1. On-Site Safety

All contractor employees working on the project will be required to comply with all ASARCO safety practices and all WISHA safety regulations. Contractors will be informed of specific ASARCO requirements before demolition work begins.

Existing plant security measures intended to discourage unauthorized entry to the site will continue throughout implementation of the Site Stabilization Plan. These measures include:

- The entire site is surrounded by a cyclone fence.
- A sign is posted at the main gate directing individuals entering the plant during the day shift (7:30 A.M. to 3:30 P.M. on weekdays) to report to the main office before proceeding into the plant.
- Between 3:30 P.M. and 7:30 A.M. on weekdays, and all day on weekends and holidays, the main gate is locked and a security guard patrols the property on a regular basis.

2. Transportation Safety

Trucks transporting material from the demolition area to temporary storage at the fine ore bins or incineration at the converter will travel for the most part on ASARCO property. At one point, however, trucks will leave ASARCO property to cross Ruston Way in order to enter the plant's south gate. Appropriate measures will be taken to flag and direct traffic on Ruston Way during truck crossings to eliminate the potential for accidents that may result in releases of hazardous materials. From the south gate, trucks will continue on ASARCO property to the converter or fine ore bin area.

C. AMBIENT AIR MONITORING AND EVALUATION PROGRAM

1. Monitoring Network

The primary purpose of the ambient air monitoring program is to measure tne ambient concentrations of arsenic (As) in the area immediately surrounding the smelter demolition site outside ASARCO property. The monitoring network to accomplish this shall consist of six low-volume samplers bracketing the site at the following locations:

Station Name	Address
Tavern	N. 49th & Baltimore
Parking Lot	N. 52nd & Bennett
Mussig	4752 N. Winnifred
Ruston	N. 46th & Orchard
Plant North	Near North Fence Line
SO_2 Plant	Vicinity of SO_2 Plant

The sampling apparatus at these locations will consist of a filter holder designed to accept a 102 mm (4-inch) diameter filter, followed by a pulsation dampener, a one-twelth horsepower vacuum pump, and a dry gas meter. The pump is set to draw air through the filter at a rate of about one cubic foot per minute. The sampled air is exhausted from the gas meter. The filter holder is shielded from precipitation by a non-corrosive, semicircular plastic shield about 8 inches in diameter and 10 inches long.

In addition to the six low-volume samplers described above, ASARCO shall operate a high volume sampler on Vashon Island or Maury Island at a location agreed to by the EPA and ASARCO OSC's.

2. Sample Collection and Analysis and Evaluation of Results

At the six monitoring locations bracketing the site, samples will normally be collected for a 24-hour period each day of the week during implementation of the Site Stabilization Plan. In the event that demolition activities are halted for any reason for a period greater than three consecutive days, on the fourth day ASARCO may reduce monitoring to the Tavern and Parking Lot stations. The samples shall be shipped daily to ASARCO's laboratory in Salt Lake City, Utah for analysis of As concentration in units of micrograms per cubic meter (ug/m^3). Samples from the Vashon or Maury Island monitoring location shall be collected on a weekly basis and shipped to ASARCO's Salt Lake City laboratory with that day's samples from the other six monitoring locations.

The results of the analyses shall be submitted by phone to ASARCO's OSC within 48 hours of collecting the samples. Samples from periods ending on weekends and holidays will be shipped to Salt Lake City with the next regular working day sample. ASARCO's OSC shall report the results immediately to EPA's OSC. Results will also be submitted in writing to EPA on a weekly basis.

ASARCO plans to use common carriers or the mail to transport filters to Salt Lake City. Interruption of these services due to conditions outside of ASARCO's control, such as adverse weather, shall relieve ASARCO of its responsibility to submit results of analyses within 48 hours of collecting samples. However, ASARCO will take measures to submit results of sampling as soon as reasonably possible under the circumstances. The ASARCO OSC shall immediately notify the EPA OSC of the conditions causing the delay, and shall document these conditions in the next monthly report.

3. Quality Assurance/Quality Control

All samples from the air monitoring network shall be handled according to quality assurance/quality control (QA/QC) procedures acceptable to EPA in order to ensure sample integrity. These QA/QC procedures include, but are not limited to, sample removal and handling, chain-of-custody, assessment of sample transit deterioration as necessary, and interlab comparisons. A QA/QC plan is being developed as part of the RI/FS. Procedures contained in this plan will be applied to the air monitoring program and other sampling programs conducted during implementation of this Site Stabilization Plan.

ASARCO currently has a standard procedure for handling filters from air samplers to ensure that particulates entrained in the filtering media are not lost before the sample is analyzed. This procedure will continue to be used during demolition. At the time of sample collection, the in-use filter holder is removed and placed in the "sample saver" cover for that location, which is transported in a field carrying case. The filter holder is immediately replaced with another filter holder containing a new filter.

Upon return to the plant, the exposed filter is removed from the filter holder and placed face-to-face with a blank unexposed filter. Both filters are then placed between protector disks and rigid cardboard cover backings before insertion into a plastic envelope for shipment. The location of the monitoring station, monitoring date, and air volume are recorded on one of the cardboard covers.

Upon arrival at ASARCO's analytical laboratory in Salt Lake City, both filters are digested and analyzed for total arsenic. Handling of the sample in the above manner prevents loss of particulate arsenic prior to analysis.

4. Meteorological Measurements

ASARCO shall operate and maintain a meteorological station at the site designated as "Tavern". Measurements which will be made include wind speed and direction.

VI. ON-SITE REVIEW AND APPROVAL PROCEDURES

The purpose of this section is to outline the interaction between the EPA and ASARCO OSCs in relation to various site stabilization related activities at the Tacoma Smelter. Reference to either the ASARCO or EPA OSC shall extend to a designated representative for each to act in their absence.

A. PLANNING

1. Monthly

Using the overall Site Stabilization Plan, ASARCO shall develop a monthly implementation plan. This plan should be submitted to the EPA OSC no later than seven calendar days prior to the beginning of each month. The purpose of the monthly plan is to outline a weekly implementation schedule, report on the wastes to be shipped off-site, identify the types of demolition waste expected to be generated, specify pre-demolition sampling to be done, and incorporate changes in the Site Stabilization Plan necessitated by on-site circumstances not known in developing the original Site Stabilization Plan.

The seven-day period will give EPA an opportunity to review the proposed work. If EPA does not disapprove the plan within the seven calendar day period, the plan shall be considered approved. If variations from the Site Stabilization Plan are required, this submission will serve as a record of the EPA approval of these changes.

The results of the accomplished actions of the Site Stabilization Plan will be described in the monthly progress report required by this Administrative Order.

2. Daily

The EPA and ASARCO OSCs will meet, when possible, at the end of each day to discuss that day's activities, any problems with sample shipment and/or sample analysis, weather forecasts and any forseeable changes for scheduled work. If the EPA OSC is not on site and changes to the next day's activities are predicted, ASARCO's OSC shall contact the Superfund Project Officer in the Seattle office of EPA.

3. Contingency

There is a potential for unforeseen problems to occur during demolition that may require modifications to the procedures described in this Site Stabilization Plan or immediate action to prevent risks to human health and safety. In the event that such problems occur, ASARCO's OSC will immediately consult with EPA's OSC to develop a contingency plan to resolve the problem. In cases where there is an immediate risk to human health or safety, it may be necessary to cease demolition activities until the contingency plan is implemented.

B. DEMOLITION

Before each demolition or demolition-related activity commences, the EPA and ASARCO OSC's shall agree that, to the extent practicable, all materials analysis, preparation and cleaning work is complete.

C. MATERIALS TESTING

1. Pre-demolition

Prior to demolition, the EPA and ASARCO OSCs shall determine the general extent or level of contamination of the structure for the purposes of ultimate disposal. As much as possible, clean portions of buildings or other areas subject to demolition will be identified. To the extent practicable, materials suspected of being contaminated shall be tested for contamination to the extent necessary to meet the disposal options as set forth in Section IV of this Site Stabilization Plan.

2. Post-demolition

After demolition, further evaluation of the debris shall be made by the EPA and ASARCO OSCs to the extent necessary to meet the disposal options as set forth in Section IV of this Site Stabilization Plan.

D. METEOROLOGICAL CURTAILMENT

Scheduling of daily activities shall be contingent on review of a daily weather service meteorological forecast or similar forecast, together with a review of current data from the meteorological station referenced in Section V.C.4. The EPA and ASARCO OSCs shall review the next day's forecast the night before. Also, the current day's forecast shall be reviewed the morning of the day demolition or demolition-related activity is scheduled. If a combination of wind speed, direction, temperature conditions and proposed demolition activities has the potential of generating significant fugitive emissions escaping beyond the plant boundary, demolition shall not proceed as scheduled or shall stop if already underway. In particular, major demolition activities involving masonry structures or earthmoving shall cease when it is predicted that a north or northeast wind will be prevailing or any condition of an air pollution episode declared by the Department of Ecology for an area including Tacoma.

E. AMBIENT LEVELS OF As

If the results of the ASARCO monitoring network As analyses show that the As concentration has exceeded 2 ug/m^3 at any location, ASARCO's OSC shall immediately notify the EPA OSC, and the ASARCO OSC shall determine to the extent possible with available data the on-site activity that was the source of the monitored ambient emissions. ASARCO's OSC will verbally inform EPA's OSC of this evaluation, which will be included in the weekly report. The EPA OSC and ASARCO OSC shall determine whether this on-site activity should be modified, delayed, or curtailed to prevent recurrence, or whether no additional action is necessary.

APPENDIX A

WASTE WATER EVAPORATION SYSTEM

As shown in Figure 3, surface water runoff from the No. 1 and No. 2 brick flues and arsenic plant flows into a surface drain that proceeds along the passageway between the Godfrey roasting area and the Herreshoff roaster building. This water flows to a collection box at the south end of the Herreshoff roaster building. Additional water from other areas of the arsenic plant also flows to this collection box. As water fills the box, it flows by gravity through an aboveground PVC line to a concrete basin located south of the acid plant. There are two additional sources of water entering the concrete basin: water draining through a subsurface line from the vehicle tunnel and water draining through an underground line which extends along the base of the bank southeast of the Herreshoff roaster building. Although there are other potential lines feeding water to the system from the acid and liquid SO_2 plants, these are not in use currently.

The concrete basin has a capacity of approximately 28,125 gallons. As water fills the basin, it is pumped through an overhead PVC line to the No. 1 refinery building. A small amount of water from the first rinse at the laundry is also added to the system at this point. Water is also pumped from a sump at the concrete sump directly to the No. 1 refinery building. As water enters the building, it is diverted to one of two 30,000 gallon collection tanks in the basement. Water is subsequently pumped upstairs through a heat exchanger and piped to one of several channel boxes, which serve Systems 2 and 3 in the building. Water flows by gravity from the channel boxes to one of 144 lead-lined tanks in each system for evaporation. Including the two collectors, the present waste water system in the refinery building has a capacity of 348,000 gallons. At the current estimated evaporation rate of 25 gallons per minute, the waste water system has the capability of evaporating 36,000 gallons of water per day.

If additional volume is necessary to handle excess stormwater runoff during the rainy season, System 1 in the No. 1 refinery building is also available to evaporate water. It has the capacity to handle 174,000 gallons of water. An additional four systems would also be available in the No. 2 refinery building to either store or evaporate excess water. This would provide an additional 560,000 gallons capacity, including tanks and collectors. Because the entire waste water system was capable of handling all process scrubber water from the acid and SO_2 plants and stormwater runoff from the arsenic plant during smelting operations, it should be more than adequate for stormwater runoff and any additional water generated during demolition operations.

As water in the waste water system evaporates, solids settle out in the various tanks. These solids are collected as a product of the evaporation process using the following procedure.

Individual tanks are periodically drained of water by opening the side drain plug in a particular tank. Water flows from the tank to one of three collection tanks in the basement. Subsequently, the drain plug at the bottom of the tank is opened, allowing the remaining mud and water to be washed to the mud sump located in the middle of the basement floor. The material is then pumped back upstairs to a settling tank. At this point, mud and water are separated by filtration through a cloth filter. Water drains from the tank through a drain at the bottom and flows to a collection tank. Mud is scraped from the filter periodically during this process, and is subsequently pumped with a diaphragm pump to one of two vats. With the use of electric heaters, the material is evaporated to a wet residue. The residue is then shoveled by hand into covered railroad cars or plastic lined drums for shipment to ASARCO's East Helena, Montana lead smelter for recovery of metal values.

Periodically, water in the concrete basin will be completely pumped out, and residue will be removed using a vacuum truck. This residue will also be shipped to the East Helena lead smelter.

APPENDIX B

IDENTIFIED ASBESTOS MATERIALS IN COTTRELL AREA AND ARSENIC PLANT*

A. COTTRELL AREA

1. Pipe Treater Building

   Outside on North End Wall - Above and below second floor walkway
   45 by 35 ft of blown-on insulation

   Outside Wall Cover - Northwest wall
   15 by 60 ft insulation under sheet metal

   Inside - Ground floor along center hopper row
   3-in. steam line, 80 ft

   Inside - Ground floor along center hopper row
   Two 3-in. oil lines, 80 ft

2. No. 1 Plate Building

   Outside - North end wall, second floor
   15 by 60 ft insulation under sheet metal wall cover

   Outside - Along south side of building to stack burner building
   3-in. steam line, 300 ft
   Two 3-in. oil lines, 300 ft

---

* In addition to the materials listed here, transite asbestos sheets may be found at various locations throughout the demolition area.

Inside - Lower sections of hoppers in Sections E, F, G ground floor
25 sq. ft

Storage Box - By operator shed
gasket, rope type, 100 ft

3. Stack Burner Shed

Inside - Oil reserve tank
4 by 6 ft insulation

3-in. steam line, 30 ft to breakroom

B. ARSENIC PLANT - METALLIC ARSENIC AREA

1. Condenser - Along lid

50 ft of rope gasket

2. Wood Storage Cabinet

1/2- in. rope, 300 ft, boxed
1-in. rope, 100 ft, boxed

3. No. 2 Flue - Along north side from boiler building to Cottrell Pipe Building
   a. 3-in. steam line, 450 ft
   b. 2 in. oil line, 450 ft

4. No. 2 Flue - Ceiling above acid sprays

2-in. steam line, 60 ft

APPENDIX C

PERFORMANCE TEST AND MONITORING PROGRAM FOR USING ASARCO CONVERTER NO. 1 TO INCINERATE COMBUSTIBLES

Performance Test

The No. 1 converter incineration system for combustibles shall not be used until the following conditions have been met and documented:

1. An estimate of the temperature regime in the converter and the residence time of the products of combustion (POC). An estimate of the expected degree of turbulence is also needed.

2. A particulate emission test will be conducted downstream of the electrostatic precipitator (ESP) utilizing EPA Methods 1-5, or modifications thereof as agreed to by EPA and ASARCO. Modifications may include: (a) assumption of percent moisture rather than conducting Method 4; (b) increasing the number of sampling points in case the 8 diameter downstream - 2 diameter upstream criteria cannot be met; and (c) others which may be discussed and agreed to at a presampling meeting between ASARCO and EPA.

The front half and back half catch of the sample collected using Method 5 shall be analyzed and reported separately and combined. The reporting units shall be grains per dry standard cubic foot (gr/dscf) of exhaust gas corrected to 12% carbon dioxide. The No. 1 converter incineration system is designed to meet a combined catch equal to or less than 0.02 gr/dscf. The system may not be operated if the combined catch exceeds 0.08 gr/dscf. If the result of the combined catch exceeds 0.02 gr/dscf but is less than 0.08 gr/dscf, the EPA OSC and the ASARCO OSC shall confer regarding any corrective action which should be taken.

The following parameters shall be monitored and reported during the performance test:

- o Amount, type and appearance of material to be burned;
- o Quantity and rate of natural gas consumed;
- o Volumetric flow rate of air to No. 1 converter;
- o Converter temperature; and
- o Stack gas temperature as well as static and velocity pressures at the sampling location.

3. The filter from each sample train catch (a total of 3) shall be analyzed for products of incomplete combustion as specified by EPA. The analysis shall serve as an index of relative performance for the converter.

Monitoring Program

The following process parameters will be measured and documented during the operation:

1. Continuous temperature measurement of converter off-gases will be taken at a point as close to the hood as possible.

2. Devices for continuously measuring draft in the flue system will be installed near the converter hood and at points before and after each fan. Readings of the devices shall be taken once per shift and the readings shall be recorded in a log book maintained by ASARCO.

3. An opacity monitor will be operated and maintained at all times during the incineration process. Calibration checks will be conducted to ensure proper operation. The No. 1 converter incineration system is designed to meet an opacity limitation of 10 percent. If the opacity monitor registers opacity greater than 10 percent but less than 20 percent (unless ASARCO supplies valid data to show that the presence of uncombined water is the only reason for the opacity to exceed 10 percent), the EPA OSC and the ASARCO OSC shall confer regarding any corrective action which may be taken. If the opacity monitor registers opacity greater than 20 percent (unless ASARCO supplies valid data to show that the presence of uncombined water is the only reason for the opacity to exceed 20 percent), the reading shall be reported to the EPA OSC, who shall determine the appropriate action to be taken.

ATTACHMENT B

TO

ADMINISTRATIVE ORDER ON CONSENT

REMEDIAL INVESTIGATION/FEASIBILITY STUDY

ASARCO SMELTER
TACOMA, WASHINGTON

September 1986

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RI/FS PROJECT WORK PLAN - ASARCO TACOMA FACILITY

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INTRODUCTION

In preparing this draft Plan, our project team did not have access to all technical information pertinent to the site that has been generated over the years. Some of the information that we propose to generate as part of the investigative stage (Task 3) of the RI effort may, in fact, already exist. In addition, we may have assumed that certain information is available which may not actually be available or may not be of a quality adequate to support the RI/FS effort. The first task of the RI/FS consists of a determination of the current situation which includes a thorough technical review of data generated to date. The findings of this data review can significantly impact the actual level-of-effort required for further work under the RI/FS.

Several key assumptions were made in preparing this Project Work Plan. First, we understand that The U.S. Environmental Protection Agency will act as the lead agency with communication with other regulatory agencies coordinated through them. The Washington Department of Ecology will have a role in technical review and may have involvement in the designation of any wastes destined for off-site disposal (not recycling). Secondly, we understand that ASARCO's laboratory will be able to perform the majority of chemical analyses required for this RI/FS. The EPA will institute their own QA/QC program involving testing of split samples to verify results of ASARCO's lab.

Included in this Project Work Plan as Appendix A is a schedule for completion of the project. The schedule assumes a startup date of September 1, 1985 and assumes that demolition will occur during this coming winter and spring. The Remedial Investigation Sampling and Analysis Plans are designed to be completed during the demolition process. It is clear that after demolition, the site conditions will be substantially different in many areas which may require modifications to the field programs dependant upon conditions encountered and wastes generated during demolition. The field sampling and analysis program elements completed after demolition such as soil sampling can also be incorporated into performance monitoring of the effectiveness of the demolition clean-up operation.

This document is divided into 14 sections, consistent with ASARCO's Request for Proposal. The objective of this Project Work Plan is to specifically address the requirements of CERCLA (Superfund) which are to identify "threats to human health, welfare or the environment" and to evaluate and select remedial measures to mitigate these threats. Additional studies or data collection not specifically focused toward this objective are not included.

RI/FS PROJECT WORK PLAN - ASARCO TACOMA FACILITY

Task 1 - DESCRIPTION OF CURRENT SITUATION

A significant amount of technical information that is directly applicable to the RI/FS to be performed for the Tacoma ASARCO facility is presently available. The first task of this RI/FS involves collecting and evaluating this existing information. This task is critical in scoping the remainder of the RI/FS activities. Not all of the data may be of the quality or extent required to meet the objectives of the RI/FS. The results of the data review will be a description of the nature and extent of known current conditions, a definition of the site boundary, and, in coordination with the first stage of the Feasibility Study, identification of data gaps that need to be filled to adequately characterize the situation and to evaluate proposed Remedial Alternatives. Our general approach is outlined below. More detailed descriptions of technical data to be collected are discussed under task 3 of this workplan.

1.1 Acquisition of Existing Data

To acquire existing data, key technical task leaders will participate in a thorough review of the facility and existing information. The following data sources will be reviewed:

A. Site Visit: The key members of the project team will participate in a site visit and review of the facility's history with knowledgeable employees. This will focus on known areas of concern and the history of operations at the facility.

B. Review of Past Studies: All technical studies regarding waste management, environmental affairs, geotechnical design, site drainage, air emissions, groundwater management, or other pertinent topics will be reviewed. This review will focus on identifying pertinent information and technical adequacy of the work.

C. Bibliographic Search: A review of technical documents will be made in each technical discipline to identify pertinent references to the site and the specific issues of concern in this RI/FS.

D. Review of Facility History: This review will complement the historical aspects of the facility tour. It will include a review of historical aerial photographs and maps covering the area of the facility. In addition information regarding key development stages, phases of operation of specific significant processes, and on-site slag and waste disposal will be reviewed.

E. Review of Regulatory History: A review of the files of regulatory agencies will be made to identify their concerns and to identify specific "regulatory episodes" at the facility. The files of the following agencies will be reviewed:

- EPA Region 10
- Washington Department of Ecology
- Tacoma/Pierce Co. Health Department
- Puget Sound Air Pollution Control Authority

Information collected under this subtask will be entered into the project Data Management System and will be catalogued for easy retrieval.

1.2 Summarize Nature & Extent of Current Conditions

The information collected under subtask 1.1 will be reviewed by key technical staff. The review will be focused towards identifying the following:

A. Pertinent environmental issues at the facility,
B. The location and characteristics of dangerous materials at and adjacent to the facility,
C. Site characteristics that may affect transport of contaminants,
D. The limits of the affected area,
E. Confirmed and potential receptors,
F. The confidence level in the data collected, and
F. The technical adequacy of any work completed to date.

The result of this review will be a summary report describing the site background, the nature and extent of the problem, and the history of clean-up actions.

1.3 Define Study Boundary

Based upon the review of information described above, a proposed study boundary will be defined. This boundary will delineate the limits of the area to be investigated under the RI/FS process.

1.4 Identify Data Gaps to be Filled by RI

The objective of the RI/FS process is first, to identify "threats to human health, welfare or the environment"; and secondly, identify and evaluate remedial actions which will mitigate these threats. In order to meet these objectives, certain technical data will be required. Much of this data may already exist and will have been identified and evaluated under subtasks 1.1 and 1.2 of this Task. The data gaps identified under this subtask will form the basis for development of specific Sampling and Analysis Plans for each of the pertinent technical disciplines. A conceptual understanding of proposed Remedial Actions will be required at this stage of the project to assure that specific data needs required to evaluate their feasibility and effectiveness will be identified.

Task 2 - PLANS AND MANAGEMENT

In order to effectively manage a large technical investigative effort, project guidelines will be established. These guidelines will be in the form of focused work plans. The development and adherence to these plans will help assure consistency in the approach, depth and quality of the work and will assure interaction of the specialists in the diverse technical disciplines being addressed by this RI/FS.

2.1 Management Plan

The Management Plan will clearly define responsibilities of project personnel and will define relationships of these personnel with ASARCO's management, technical and legal staff. The Plan will include a detailed project schedule, defining efforts and work products expected during the course of the RI/FS. In addition, the Management Plan will describe procedures for financial reporting to ASARCO and a schedule for technical progress reports and project team meetings.

2.2 Health & Safety Plan

A Health and Safety Plan will be developed for the protection of the investigation team personnel and for protection of the surrounding community from hazards presented by the investigation activities. In addition to the Health and Safety Plan, ambient air monitoring will be conducted in the vicinity of the site. The plan will detail personnel responsibilities, personnel protective equipment required, surveillance equipment, decontamination, specialized training, medical surveillance, and contingency planning for emergency situations. The Plan will draw substantially from ASARCO's own in-house personnel protection program. The primary focus of the plan will be toward assuring respiratory protection for personnel while on-site and minimizing contamination of skin and clothing. If possible, ASARCO's personnel changing rooms will be used by investigative personnel for personal decontamination purposes. The plan will cover procedures for the protection of site visitors associated with the RI such as regulatory agency staff. All personnel actively participating in on-site investigative activities will be required to be participating in a health monitoring program which includes a baseline physical examination. During preparation of the Health and Safety Plan as well as preparation of the Sampling and Analysis Plan, consideration will be given to monitoring radioactivity of materials sampled. The plans will address applicable regulatory requirements.

2.3 QA/QC Plan

A Quality Assurance/Quality Control Plan will be developed to assure that the entire project and its individual components are conducted in a technically correct and legally defensible manner. The QA/QC Plan will encompass the review of existing data, field program development and implementation, sampling techniques, instrument calibration, laboratory analysis, data interpretation, verification of computer models, report preparation, and personnel qualification. The Plan will include separate sections for QA/QC procedures specific to the field investigative programs of each of the technical disciplines.

Where applicable, EPA guidance documents or regulations pertaining to QA/QC will be adhered to as closely as possible. In cases where ASARCO has already developed QA/QC procedures acceptable to the EPA, such as QC for the analysis of metals, that procedure will be used. A list of pertinent EPA guidance documents, technical support documents, and regulations that will be incorporated into the QA/QC Plan is included as Appendix B.

Each technical discipline has specific QA/QC concerns and protocols relative to sampling and analysis. The technical team leader for each discipline will participate in the development of those pertinent sections of the QA/QC Plan.

One aspect of QA/QC for this type of investigation is the evaluation of acceptability of analytical laboratory data. A single qualified chemist will act in an oversight QA/QC role to review all analytical data generated during this project. It is expected that a number of replicate samples will be collected for the EPA for their QA/QC review by their own laboratory. Analytical techniques used may vary somewhat from the standard techniques outlined in Test Methods for Evaluating Solid Waste (EPA publication SW-846). In these cases, ASARCO has developed more representative analytical methods which have been approved by the EPA during previous investigations. These improved methods will be defined in the QA/QC Plans or by amendments to the QA/QC Plan. Where alternative analytical techniques are proposed to characterize waste material for designation purposes, additional approval may be necessary from the Washington Department of Ecology.

2.4 Sampling & Analysis Plan

A Sampling and Analysis Plan will be developed to address the field activities of each technical discipline. This plan will include objectives, background and approach for each technical discipline. The approach sections describes equipment, analyses of interest, samples types, locations and frequency of sampling, schedule and description of expected work products. Where possible, field screening procedures will be used to focus the needs for laboratory analytical work. This Plan will adhere to protocols established in the Health & Safety Plan, the QA/QC Plan, and the Data Management Plan. Eight separate technical areas have been identified which will be addressed in the Sampling and Analysis Plan. They are:

Waste Characterization
Groundwater
Surface Water
Surficial Soils
Air Quality
Aquatic & Biological
Receptor Identification
Slag Leaching

In the context of this RI, several of these technical areas overlap. For example, issues related to surficial soils are also linked to groundwater, surface water, and air quality issues. In those cases, the Sampling and Analysis Plan will be prepared as a team effort incorporating comments and guidance from other technical specialists on the project team. A description of work to be performed under each technical discipline of this Plan is described in Task 3 of this Project Work Plan.

2.5 Data Management Plan

A Data Management Plan will be prepared to adequately manage the technical information collected during the RI/FS. This Plan will have two separate elements being Analytical Control and a Data Management System.

The Analytical Control part of the Plan will assure that there is a single clearing point for all samples requiring laboratory analysis. This will facilitate communication between ASARCO's Corporate Laboratory staff and the project team. The person responsible for Analytical Control will be responsible for the following:

- Pre-sampling coordination with the laboratory,
- Provision of sample containers for field personnel,
- Provision of proper sample preservation instructions,
- Coordination of Chain-of-Custody Records,
- Coordination of sample shipping,
- All communication with the laboratory,
- Coordination with EPA or other QA/QC laboratories,
- Receipt and dissemination of laboratory reports, and

- Integration of data into the Data Management System.

The Data Management System will be a master inventory of all technical data collected as part of Tasks 1 and 3 of the RI/FS effort. A master copy of each piece of data will be filed under a unique number and will be cross-referenced according to its content. A cross reference library will be maintained using a microcomputer based data base system. This system will allow the rapid retrieval of topical data and will assure a central clearing point and storage location of all technical data. Upon completion of the project, this information base will be provided to ASARCO.

2.6 Community Relations Plan

Under EPA protocol for Remedial Investigations, the Community Relations Plan (CRP) is the responsibility of the regulatory agency regardless of whether the response is being managed by a regulatory agency or the responsible parties. The input to the CRP to be prepared by the consultant for ASARCO will be coordinated with the EPA and will provide a mechanism for providing technical progress reports and responses to technical questions as appropriate. However, the Consultant will provide community relations assistance to the extent determined necessary by EPA, ASARCO and their legal staff. At the present time, negotiations are underway between ASARCO and the Tacoma-Pierce County Health Department concerning a possible Health Department role in the community relations plan. Should the Health Department become involved, the Consultant will also provide community relations assistance to the Health Department, as directed.

However, should the EPA direct ASARCO to prepare and implement the CRP, a Community Relations Plan will be developed that will allow a meaningful opportunity for public comment. The CRP will specify appropriate methods for informing the affected community about the site and the progress of the remedial investigations, as well as methods for eliciting and documenting community concerns. The CRP will be developed before remedial investigations begin so that avenues for communication with the public are already in place.

Methods for informing the public about the progress and findings of the RI/FS may include meetings with affected individuals or groups; progress reports and fact sheets; briefings and new conferences; and establishment of a readily accessible public information center that contains approved technical documents, phone numbers of project contacts, and a copy of the CRP. When the draft feasibility study is prepared, a notice of availability an fact sheet will be issued, and the public will be given at least 3 weeks to comment. The final feasibility study will include a "responsiveness summary" describing the comments and concerns raised by the community during the RI/FS process and explaining how these concerns were addressed in selecting appropriate remedial actions.

Task 3 - SITE INVESTIGATION

3.1 Waste Characterization Investigation

OBJECTIVE: The objective of this subtask is to characterize certain waste materials sufficiently to allow recycling and to identify those waste materials that might be subject to regulation under the Resource Conservation and Recovery Act (RCRA) as hazardous wastes or as Dangerous Wastes under Washington Administrative Code 173-303 should offsite treatment or disposal of the wastes be required. This information will be important in the selection of remedial alternatives during the Feasibility Study since for some wastes, alternatives may include recycling, offsite treatment, or offsite disposal. This subtask is focused toward characterization and designation of wastes specifically to meet the requirements of RCRA and Washington's Dangerous Waste Regulations, and for the characterization of waste materials to facilitate recycling where applicable.

APPROACH: With the assistance of ASARCO's staff we will identify those waste materials for which off-site recycling may be a remedial alternative. Testing of wastes to be recycled will be only that required by ASARCO to facilitate the recycling of those wastes. The remaining wastes will be categorized into those for which offsite treatment or disposal is a possible alternative and those for which other options may be available. The first group will be sampled and analyzed sufficiently to fully designate the waste and to determine the quantity. This information will be used to develop cost estimates for the offsite treatment or disposal. The wastes for which other options may exist will only be tested to the degree required to evaluate those options.

Additional waste designation may be required to determine if non-hazardous wastes are acceptable for solid waste landfill disposal. The criteria determining this designation is commonly made by the local health jurisdiction or by the landfill operators themselves.

3.2 Groundwater Investigation

OBJECTIVE: The objectives of the groundwater investigation are to characterize the groundwater flow system and groundwater quality beneath the facility, to identify contaminant migration pathways and receptors, and to assess contaminant loadings to Commencement Bay. The objective includes addressing the degree of hazard, the mobility of contaminants, recharge/discharge areas, flow directions and groundwater quality both horizontally and vertically. In addition to these general objectives, several site specific issues are to be addressed:

- o Whether groundwater from the site discharges to Puget Sound without impacting deep aquifers including drinking water aquifers;
- o The metal flux to Puget Sound, long term disposition of contaminants, and whether dimethylaniline has migrated into groundwater.
- o Coordination of the groundwater investigation with the demolition activities.

Of particular significance in assessing the site conditions as part of the RI is the determination of the mobility of metals in the groundwater environment. Our understanding is that EP toxicity tests indicate that metals in the slag materials are not very soluble. The effects of metals mobility in the presence of acidic groundwater or infiltrate will be considered in the groundwater evaluation.

Our preliminary review of existing data (approximately 30 geologic logs and aquifer studies completed in the area contained in Hart-Crowser files) indicates that the site is underlain by relatively low permeability deposits at varying depths. These deposits include silts/clays of the Kitsap Formation and silty sands which comprised the original and now covered off-shore sediments.

Within the west half of the facility the low permeability Kitsap Formation deposits are covered by fill material, low permeability glacial till, and permeable glacial outwash (sandy gravel). The low permeability sediments are relatively close to the surface within the west and southern two-thirds of the site. However, within the west and northern third of the site, adjacent to the Tacoma Boat Basin, coarse sand and gravel overlie the Kitsap Formation to a substantial depth.

Substantial slag deposits (reported to be up to greater than 50 feet thick) overlie the off-shore sediments . The slag materials were used as fill to increase the effective land area of the facility and underlie the eastern half of the site.

Groundwater beneath the area flows eastward towards Commencement Bay. Seeps and springs are present along the upland area adjacent to the west side of the facility. Water from these sources and from deeper groundwater sources flows onto the site, migrates through the fill, natural soils , and slag, and likely discharges to the Bay. Groundwater seepage has been observed in the tunnels and flues. Groundwater levels, at least in the slag deposits located adjacent to the bay, are affected by tides.

APPROACH: We propose to complete the groundwater assessment in two phases. Phase 1 will be directed towards conducting a general plant-wide groundwater assessment. The objective of Phase 2 is to provide groundwater data at specific locations once the need has been identified based on historical information, soil data, and the Phase 1 groundwater data.

This task will be completed more or less concurrently with the soils evaluation (Task 3.4). Laboratory analysis of soil samples and evaluation of soil data is discussed later in this section.

The groundwater investigation will have to be coordinated with the demolition activities planned for the electrostatic precipitators, brick flues, arsenic plant, and other structures. To the extent possible, wells will be located in areas where minimal interference with demolition will occur. Where wells are required in the demolition areas, consideration will be given to the timing of well installation. Possible protective measures might be incorporated to ensure the future integrity of the wells.

Phase 1 Groundwater Investigation

Review of Existing Data

Review of existing data will largely be conducted as part of Task 1.Regional and site specific hydrogeologic and water quality data will be reviewed and evaluated. These data will be used to develop an understanding of the groundwater site conditions including the relationship, if any, to drinking water aquifers which could have been impacted by site activities.

Sources of data that will be reviewed include the files of Asarco, Department of Ecology, EPA, United States Geological Survey, Parametrix and Hart-Crowser. During this review, data will be used to construct a regional surficial geologic map and regional geologic profiles to evaluate the hydrogeologic relationship between the site and regional aquifers. In addition, the near and on-site data will be used to prepare a surficial soils and fill map for the site and prepare site specific geologic profiles.

Site Reconnaissance

A detailed hydrogeologic field reconnaissance will be conducted along the west perimeter of the site including the stack and flue area. Surficial soil conditions will be mapped and evidence of near surface groundwater seepage will be noted. These observations will be used to refine the map prepared during the data review work and be used to assess near surface water travel pathways onto the site.

Based upon the results of the review of existing data, site reconnaissance and other available data, the remaining portion of the proposed work plan will be reviewed and modified as appropriate.

Well Installations

To complete the groundwater assessment we propose to install wells at the 11 locations shown on the attached map (Figure 1); wells are designated as P-1 to P-11. The wells will be installed using either a conventional hollow stem auger drilling rig (in non-slag areas) or a drilling rig equipped with an ODEX drilling tool (in slag areas). The use of drilling fluids will be avoided as possible. Drilling materials will be placed in barrels and stored on-site awaiting final disposition.

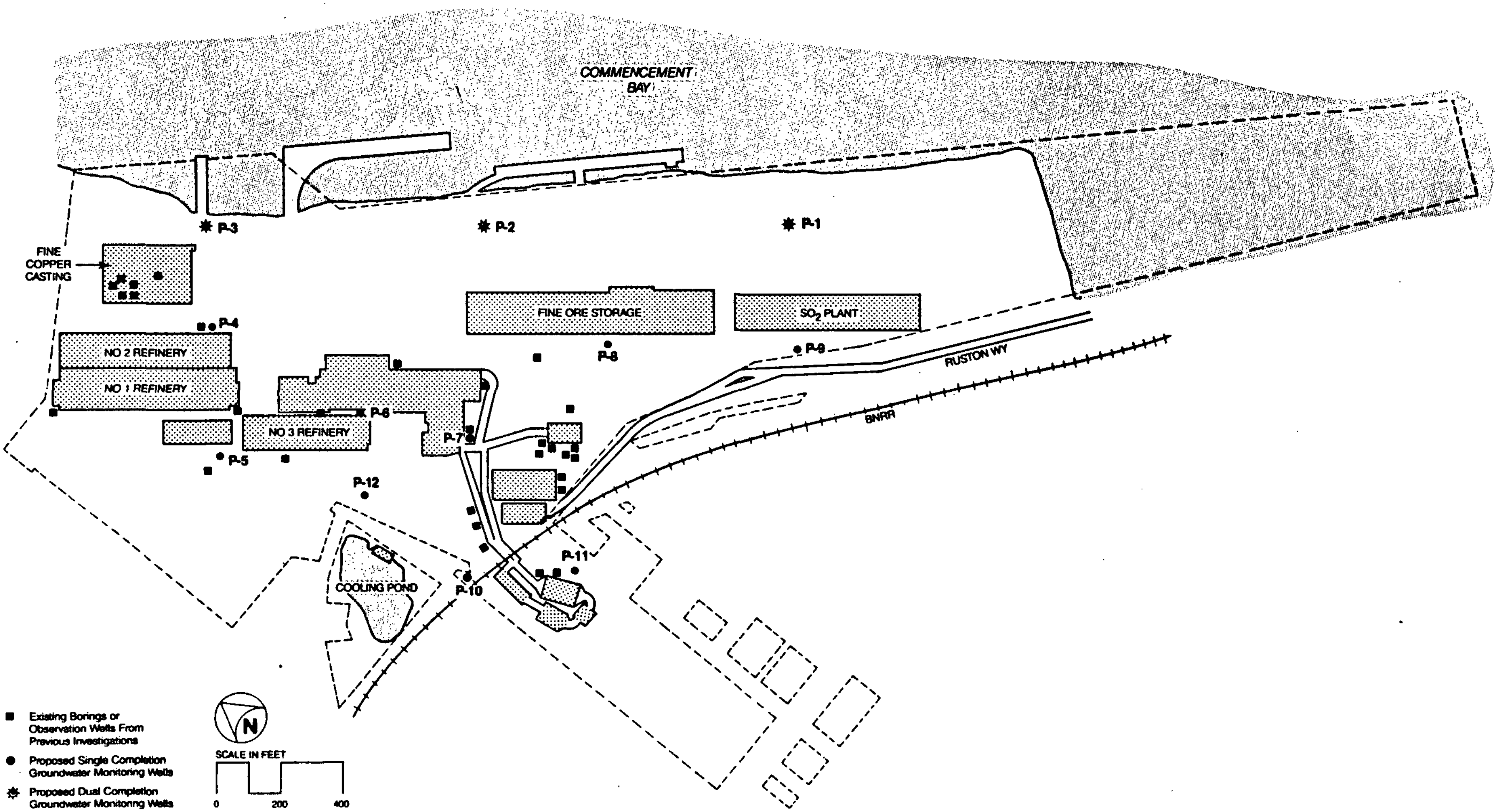
The wells will be used to characterize the overall site conditions. At locations P-1 to P-3, two wells will be installed (in separate boreholes) to evaluate hydraulic and chemical concentration gradients in the thicker portions of the slag. At locations P-4 to P-11, only one well will be installed.

The wells will be installed in borings drilled until the low permeability Kitsap Formation deposits or until the off-shore sediments (in slag areas) are encountered. Soil samples will be collected using split spoon samplers, where possible. Sampling will occur at 2.5 feet intervals in the non-slag areas using the hollow-stem auger.

In the slag areas, samples will be collected at 10 feet intervals using the ODEX drilling system. This system is required to enable drilling through the very hard slag materials, and, at the same time, allowing the collection of soil/slag samples. Previous on-site experience has demonstrated that collection of slag samples is possible using a driven, barrel sampling technique, such as a split spoon, or larger diameter, heavy-duty sampler. If it is not possible to collect samples in the slag, air-lifted drill cuttings will be used to characterize the slag.

All samples will be placed in clean glass jars with teflon lined lids and be packaged in coolers containing ice for delivery to the analytical laboratory according to the requirements of the soils investigation (Subtask 3.4).

Figure 1.
Existing and proposed soil boring and groundwater monitoring well locations.



During drilling, geologic samples (soil and fill materials) be analyzed for pH.

After the borings have been completed, they will be conv into wells by telescoping a 2-inch diameter PVC screen and pipe through the auger center. Well screen lengths will be 10 feet long. A silica sand pack will be placed aroun screen, and as the auger is extracted, a bentonite grout will be installed above the sand pack. Each well wi finished with 2 feet of stick-up above ground surface, a cor surface seal, a metal monument, and locking cap.

Well screens will be located within the first water bearing encountered during drilling. This zone is anticipated t above either till or the Kitsap Formation within the west ha the site and within slag within the east half of the sit most well locations completed for the plant-wide ground assessment only one well will be installed. However, at the eastward well locations where the slag is thickest, a second will be installed to assess vertical hydraulic and che concentration gradients. The initial well will be dr through the slag and the well screen will be placed toward bottom of the slag. A second well screen will be installed separate adjacent borehole (without geologic sampling), w the upper portion of the slag which lies below the water t The soil/fill pH data will be used to help determine the lo for the well screens.

Once the wells have been installed they will be developed using either a bailer or compressed air. Drill cuttings from the borings will be placed in 50 gallon drums and stored on site for analysis and future appropriate disposal by ASARCO. Waste water generated by well development will be pumped to the surface water collection system for appropriate treatment.

All drilling operations will be under the observation qualified hydrogeologist or engineering geologist. This in ual will prepare detailed geologic logs of the materials en ered, collect drill samples, prepare as-built drawings o wells, and initiate chain-of-custody procedures for samp appropriate.

The following table lists the proposed drilling depth methods. The depths are based on our review of the avai data on subsurface conditions.

Proposed Drilling Depths and Methods

Location	Depth (in feet)	Method
P-1a	30	ODEX
P-1b	75	ODEX
P-2a	30	ODEX
P-2b	75	ODEX
P-3a	30	ODEX
P-3b	75	ODEX
P-4	30	HSA*
P-5	75	HSA*
P-6	30	HSA*
P-7	30	HSA*
P-8	50	HSA*
P-9	50	HSA*
P-10	50	HSA*
P-11	60	HSA*
P-12	45	HSA*

*HSA-Hollow-stem Auger

Assess Groundwater Flow Directions and Rates

Once the wells have been installed, the elevation of the well heads (top of casing) will be surveyed to a common datum. Water level measurements will be made in the wells to assess groundwater flow directions and the effects of tides.

Initially three wells in a line perpendicular to the shore line will be instrumented with water level monitoring equipment. Selection of these wells will be based on a review and evaluation of existing data. Water level fluctuations for two tidal cycles will be monitored. The two tidal cycles to be monitored will be selected during a spring (extreme) tide series. This data will be used to estimate the correlation between tides and groundwater fluctuations. Using the data from the tidal analyses, the times for maximum and minimum groundwater elevations will be estimated.

Three sets of water level measurements will be made which correspond to highest, lowest, and an intermediate groundwater elevations. For each set of measurements a groundwater contour map will be prepared to evaluate groundwater flow directions and hydraulic gradients.

Hydraulic conductivity tests will also be conducted in each of the installed wells. In-situ (slug) tests will be conducted. A

teflon rod will be used to displace the water in each well and a direct data acquisition system developed by Hart-Crowser will be used to record water levels.
Five selected samples of the low permeability soils (obtained from the drilling) will be tested in the laboratory to determine hydraulic conductivity.

Groundwater Sampling and Chemical Analysis

Groundwater samples will be obtained from all new well completions. In addition, 5 water samples will be obtained at spring and seep locations and the cooling pond.

Prior to sampling the wells, 4 to 6 well casing volumes will be removed. Well samples will be obtained using a dedicated bailer. All groundwater samples will be placed in appropriate containers and be preserved according to EPA protocols and the sampling and analysis plan developed in Task 2. Both filtered and unfiltered groundwater samples for metals analysis will be obtained during well sampling in the first sampling period. The filtered portion will be passed through a 0.45 micron filter prior to preservation. Established chain-of-custody procedures will be followed during all sampling.

Analyses for the following constituents will be made:

Field: pH, specific conductivity and temperature

Laboratory: Metals (priority pollutant metals); Total organic carbon; total organic halide; base- neutral-extractable priority pollutant organic chemicals (to evaluate the presence of dimethylanaline) and the following specific organics: dibenzo-furan; dichlorobenes; 2-methylphenol; 4-methylphenol; phthalate esters; 1-methyl (2-methylethyl) benzene; biphenyl; dibenzothiophene; methylphenanthrenes; retene; methylpyrenes; and PCB's.

In addition, during the initial sampling round, we propose to analyze the sample from well P-2 for solvents and conduct a base, acid, neutral organic chemical scan (this well is downgradient of areas where fuels and solvents were reportedly used). We will also assess the need to complete analyses for other chemical parameters.

Data Analysis and Reporting

The geologic, groundwater and chemical data will be analyzed to assess the general groundwater flow and quality conditions beneath the facility for a one-year period. These data will be assessed to evaluate the impacts to groundwater quality from the various plant activities to identify cause and effect relationships. An interim groundwater assessment report will be prepared after the initial round of sampling and chemical analyses are completed which will include:

- Site map showing well and sampling locations,
- Geologic logs and drawings of the as-built wells,
- Surficial soils map of the site (using data obtained as part of Task 3.4),
- Refined geologic cross sections and profiles showing regional and site specific subsurface relationships and aquifers in the area,
- Groundwater contour maps showing general groundwater flow directions and an assessment of the effects of tides on the groundwater system,
- Groundwater flow rates,
- Discussion of water quality conditions beneath the site including how past plant activities have affected groundwater quality as indicated by the available water quality data,
- Contaminant migration pathways, contaminant mobility and contaminant loadings to Commencement Bay with an assessment of the degree of hazard to the bay or aquifers in the area (if any),
- Description of the field well installation and sampling procedures and chain-of-custody records, and
- Additional data requirements, as appropriate.

Phase 2 Groundwater Investigation

Phase 2 is directed towards providing geologic, hydrologic and water quality data at specific locations. The number, location and sampling program of the additional Phase 2 wells will be based on ASARCO and EPA's review of the data obtained during the completion of Task 1 and the Phase 1 groundwater assessment. The wells will be installed and sampled in a similar fashion as outlined in Phase 1.

The Phase 2 groundwater data will be combined with the previously collected data and analyses to prepare the groundwater section of the Remedial Investigation Report.

3.3 Surface Water Investigation

OBJECTIVES: The overall objective of the proposed surface water investigations is to fully determine the nature and extent of the threat to public health or welfare or the environment caused by contaminated surface waters present on or leaving the study area. More specifically, these investigations are intended to:

- o Identify the location and size of the exiting drainage systems, conduits and natural drainage courses that convey surface waters onto, within, and away from the study area.
- o Determine the integrity of the on-site drainage systems identified above.
- o Analyze data provided by existing monitoring of three ASARCO outfalls.
- o Determine the source(s) quality and volume of surface waters conveyed through the study area by the above identified drainage systems.
- o Provide adequate technical and scientific data with which to identify levels and sources of contamination present in on-site as well as background surface waters and with which to identify potential impacts to public health or welfare or on aquatic or terrestrial biota.

A map of the existing surface water drainage system pertaining to the proposed demolition area (previously developed for the 1986 Site Stabilization Plan) will be consulted. This map provides a guide to these subsurface drainage structures that convey surface waters to the evaporation system. This system is currently capable of removing 29 gallons per minute of those surface waters collected on-site. Studies have reportedly been conducted by Ecology that surveyed the on-site drainage systems. This information will be consulted prior to any field sampling or evaluations regarding surface water drainage in the study area. Topographic maps will be utilized to delineate general flow patterns for site surface waters. Chemical test data regarding on-site waters appears to be limited. Existing data will be obtained in order to evaluate historical problem areas regarding surface water seeps, conduits or natural drainage courses. Seeps and surfacing ground waters have previously been identified on portions of the site (Hart-Crowser, 1976). Volumetric flow data appears to be lacking for surface waters of the study area but may be estimated using existing rainfall data and information regarding percentage of impervious surface area (i.e., roofs, pavement, etc.) on the site.

APPROACH: In order to evaluate the nature and extent of surface water quality problems associated with the study area, it will be necessary to conduct investigations into surface water runoff from the site. Such investigations must examine the existing drainage systems, conduits, and natural drainage courses that convey surface waters onto, within, and away from the study area.

The selection of appropriate monitoring stations for surface water flow and quality will require that a reconnaissance field survey be conducted during a significant rainfall event. Such a survey will be used to identify those water courses sufficiently large and practicable for sample collection. During the reconnaissance survey, estimates of surface water flow moving through observed drainage courses or conduits will be made. Strategic locations will be noted on site field maps for later flow gaging and sample collection for chemical analysis.

The pollutant loading contribution of off-site surface waters will be quantified based upon evaluation of up-slope surface waters entering the site. Sources and monitoring sites for those waters will be identified during the reconnaissance survey.

Actual sampling of major surface water flows will include: (1) Those waters present on the ground surface and natural drainage courses; (2) waters reaching subsurface drain pipes and conduits, and; (3) those surface waters discharging to marine receiving waters.

Utilizing the selected sampling stations identified in the reconnaissance survey, sample collection of surface waters will take place during storm events. A total of three storm events will be used to characterize the runoff volume and quality of surface waters associated with the study site. Flow-proportionating samplers will be utilized for the collection of all composite chemical samples. These composite samples will be collected over the duration of the storm or for 24 hours. Automatic samplers will be utilized for sample collection of surface water discharge(s) to the marine receiving waters and for the major conduit flows on-site. During the storm events, discharge measurements, as well as chemical characterization, will be made for surface waters entering the marine receiving waters from existing outfalls utilized for storm water discharges. This information will be utilized to calculate mass pollutant loadings to the receiving waters.

Strict chain of custody procedures will be follows during sample collection, handling and transport. All sample stations will be located and identified on the site map prepared under Task 1.

Samples for chemical analysis will be collected according to proper protocol and in appropriately cleaned containers (i.e., solvent rinsed). Chemical analysis will be conducted on grab and composite samples collected during each storm event. Pollutants of concern have been identified in the Commencement Bay Near-shore/Tideflats RI (1985) and include the following:

Metals	Organics
Antimony	Low molecular weight polycyclic aromatic hydrocarbons (LPAH)
Arsenic	High molecular weight polycyclic aromatic hydrocarbons (HPAH)
Cadmium	Dibenzofuran
Copper	Dichlorobenzenes
Lead	2-methylphenol
Mercury	4-methylphenol
Nickel	phthalate esters
Zinc	1-methyl (2-methylethyl) benzene
	biphenyl
	dibenzothiophene
	methylphenanthrenes
	retene
	methylpyrenes
	PCBs
	dimethylanaline

All samples will be analyzed for metals concentrations. Organic constituents will be analyzed on the first set of samples only, unless significant levels are identified. Other parameters to be analyzed on surface water samples include the following conventional parameters:

Total suspended solids
Dissolved oxygen
pH
Specific conductivity

All chemical analyses will be conducted at the ASARCO laboratory following standard US EPA laboratory procedures for analysis of priority pollutants.

Chemical and physical data collected will be compiled, cataloged by station, and used to identify sources of surface runoff water and associated contaminants. Evaluation of the drainages sampled will provide information with which to determine potential health or environmental effects and with which to evaluate feasible solutions for surface water management.

If demolition activities are ongoing during the initial stages of the surface water investigations, then monitoring may be restricted to upslope or adjacent areas and existing outfalls. At the end of demolition, monitoring will then focus on the area subject to demolition. Thus, phased sampling way be required for the surface water assessment described herein.

Dye studies will be conducted in order to determine remaining unknown routes of subsurface drain lines. Water and dye will be introduced into those drain intakes having undefined outlets. Routes will be identified on a surface water drainage map (scale 1 inch:100 feet) for the site that includes all drainage courses conduits, pipes, and sumps identified in the field studies.

During the period of site stabilization activities, water samples will be collected from each of three existing permitted outfalls on a 24-hour basis. Samples from the North outfall may be composited into a weekly sample. Samples from the Middle and South outfalls will be maintained in daily sample form. Water samples from the outfalls shall be sent to the ASARCO laboratory in Salt Lake City for analysis twice per week. The results of this analysis shall be verbally reported to the EPA OSC within five working days after receipt of the samples at the laboratory and the results shall be included in the monthly report. If the analysis of the samples collected during site stabilization activities are not significantly different from the results of samples collected prior to the site stabilization phase, this sampling and reporting protocol may be modified by agreement of the EPA and ASARCO OSC's.

3.4 Surficial Soils Investigation

OBJECTIVE: The objective of the soils investigation task is to determine the location and extent of contamination of surficial and subsurface soils. Soils data is required to:

- evaluate contaminant sources within the site that are contributing to impacts on groundwater and surface water quality;
- provide data to the air quality investigation (particle size, chemical composition) to enable assessment of fugitive dust emissions related to possible remedial alternatives;

- assess how the soils would be classified should they have to be removed from the site and provide data to prioritize remedial activities within the site;
- evaluate the surficial soils in the subject area of the Site Stabilization Plan upon completion of demolition activities;
- provide information on the geographical distribution of the contaminant loads in the surficial and subsurface soils of the site.

The subsurface conditions vary widely over the site. Extensive slag materials have been placed over much of the east half of the site. The slag materials become thicker towards Commencement Bay and overlie offshore sediments. Other fill materials have also been placed over the west half of the site. These materials include soils (gravel, sand, and silt) mixed with brick rubble, wood, and slag debris. These materials overlie natural soil deposits which lie at depths generally less than 30 feet. Some areas of the site have been more severely impacted by releases to surficial soils during the years of operation of the facility. Contamination of soils and fill materials may be the result of the composition of the materials themselves and/or caused by spillage, leaching or other processes during the operation of the facility.

Demolition activities will require that this subtask take a phased approach. In areas not directly affected by the demolition, sampling can proceed immediately. Upon completion of demolition activities, the remaining soils will be sampled both as a test of the effectiveness of the demolition cleanup operation and for an evaluation for the purposes of this RI/FS.

APPROACH: Our approach to the soils investigation will be to use, to the extent, possible existing data to refine and implement a cost effective sampling and analysis plan. A variety of data sources will be used including previous investigations, historical information as to past plant configurations and activities, boring log data, leaching tests and existing chemical analyses, etc. Soil samples obtained during the groundwater investigation will also be used, analyzed, and evaluated as part of this task.

Preliminary Soils Analysis

A preliminary analysis will be made of the soil and fill conditions using existing available data. A surficial soils/fill map will be prepared showing the known subsurface conditions including fill thicknesses and type, nature of the underlying natural soils (especially related to permeability), plant activities which may have affected the chemical composition of the near surface materials (or mobility of metals such as acid spills). Using this map and associated data a refined sampling plan will be developed. This plan will be closely coordinated with other sampling tasks which require information on surficial soils (air quality and groundwater investigations).

Field Investigation

Soil/fill sampling will be conducted in several phases. An initial surficial sampling phase will be conducted to collect near surface soil samples. The intent of this phase is identify "hot spots" within the facility. Using this data and data from the preliminary soils analysis the plant would be characterized into zones as to the type and extent of surficial contamination and final locations for additional deeper soil sampling would be determined.

Determine Horizontal Extent of Metals Contamination

Approximately 40 locations would be sampled to a depth of 2 to 3 feet including soil/sediment samples from the cooling pond. Samples would be collected at 1 foot intervals, and placed in glass jars with teflon lined lids.

The soil samples would be classified as to material type and physical properties. Soil pH would be determined in the field for all samples.
The samples would be used to form 40 composite samples for chemical analysis. The remaining portions of the samples will be frozen and stored for possible future chemical analysis. Chemical analyses for priority pollutant metals will be made (total metals analyses).

Representative samples would be analyzed for particle size to meet the requirements of the air quality investigation.

Determine Vertical Distribution of Metals Contamination

Based on the results of the metals analysis of the surficial samples, locations will be selected to obtain deeper soil samples. The deep soil sampling activities will be coordinated where appropriate with the drilling of the borings to install the wells. Where possible the well locations will be shifted from those proposed to minimize the number of required deep borings.

Data Analysis

The soils data will be analyzed to:

- Characterize the soils sufficiently to evaluate remedial alternatives;
- Prepare a map showing the types and thicknesses of materials which are present on-site;
- Evaluate the nature and distribution (both horizontal and vertical) of metals contamination beneath the site;
- Define the relationship between the soils contamination and groundwater quality; and
- Provide input to the air quality portions of the work plan.

3.5 Air Quality Investigation

OBJECTIVE: The air quality program during the RI phase of the project will collect and acquire all information necessary to identify, quantify and evaluate potential sources of airborne emissions from the site. Specifically, it is anticipated that the major concerns for air quality will center on fugitive dust containing arsenic and other hazardous chemicals. The existing sources of fugitive dust will be identified, as well as possible future sources of fugitive dust for various remedial action alternatives. The characteristics of the dust which influence the emission rate, as well as the characteristics of transport in the atmosphere must be quantified through direct measurement or the acquisition of previous measurement data. In addition to gathering data which will allow the development and evaluation of remedial action alternatives, the air quality program must establish a baseline for existing conditions at the site. The understanding of existing conditions will determine whether air quality concerns necessitate a remedial action.

The work effort anticipated in the RI phase for air quality is expected to be very limited since it is anticipated that existing data will meet most of the needs for the air quality program. The collection of on-site air quality data is not specifically required for the RI phase of the current project for two reasons:

- There is a substantial data base from previous monitoring efforts in the area including many years of air quality and meteorological monitoring;

- It is impossible to sample for baseline conditions during the RI phase of the work when demolition efforts will be ongoing at the site which could potentially affect values measured at monitoring stations placed in the area;

- When demolition activities have been completed, new baseline conditions will be established.

APPROACH: The following elements are the major considerations for the air quality program which will ultimately become part of the work plan for the RI. Some of these work efforts will be performed by the air quality team themselves, but others will be performed by other members of the project team which will support the air quality effort.

- A determination of all the potentially disturbed areas at the facility. This includes structures which must be removed, soil and other bulk materials which may be removed from the site, surface areas which may be disturbed by remedial activities such as an unpaved surface which may be used as a road by trucks at the site, and any other potential source of dust at the facility which can be identified at the onset of the RI.

- A determination of the material physical characteristics which can influence potential airborne releases of dust from the facility. In particular, the particle size distribution of the surface materials is known to be very important in determining the overall emission potential.

- The chemical nature of the materials must also be evaluated. The arsenic content of the soils and other bulk materials at the site, which could potentially be disturbed by any remedial action, will be determined. In addition, arsenic dust from the possible future demolition of structures will also be of concern. It will be necessary to determine the amount of arsenic-contaminated dust still present in the structures, which will remain after completion of the Site Stabilization Plan. Other chemicals which must be considered and a sampling program for determination of the air quality potential to emit these compounds will be part of this task.

- The air quality team will also work with other project team members to define receptor locations for the impact analysis. The identification of the locations and density of the nearby population is important in the risk assessment of impacts to be performed later in the project. Exiting information gathered for previous evaluations of the site by the EPA and other organizations is expected to provide most of the data needed, however, it will be important to update and validate the earlier information.

- The final major effort to be performed by the air quality team during this task will be acquisition of all relevant air quality and meteorological data for the area. ASARCO currently maintains a database for the air quality and meteorological data previously collected at the site. The project team will also obtain any relevant data from the agencies, such as EPA Region X, or Ecology. The data will be used in the FS phase of the project. If data reduction is necessary, or if the data need to be computerized (or if the computer format of the data needs to be changed) for the FS effort, the current task will include such data preparation efforts.

- Information obtained prior to and during demolition activities will be used to formulate a monitoring plan adequate to define new baseline conditions.

The data to be used in the FS phase of the effort will be primarily collected by other team elements. It is anticipated that air quality personnel will make several visits to the site to inspect and verify the presence or absence of certain potential sources of fugitive dust emission. In addition, the air quality team will coordinate with the other project team members to ensure that data is being collected appropriately for the air quality program and to make any modifications to the data collection effort deemed necessary.

3.6 Aquatic & Biological Investigation

OBJECTIVE: The nature and extent of any aquatic contamination problem in the vicinity of the ASARCO site will be investigated through both an evaluation of sediment contamination and an analysis of biota inhabiting these sediments. We propose a strategy of stratified sampling to address those objectives. This stratified sampling will first identify the areal extent of contaminated sediments, followed later in the investigation by core sampling to define the vertical extent of contamination, and biological sampling to identify environmental effects of the contamination.

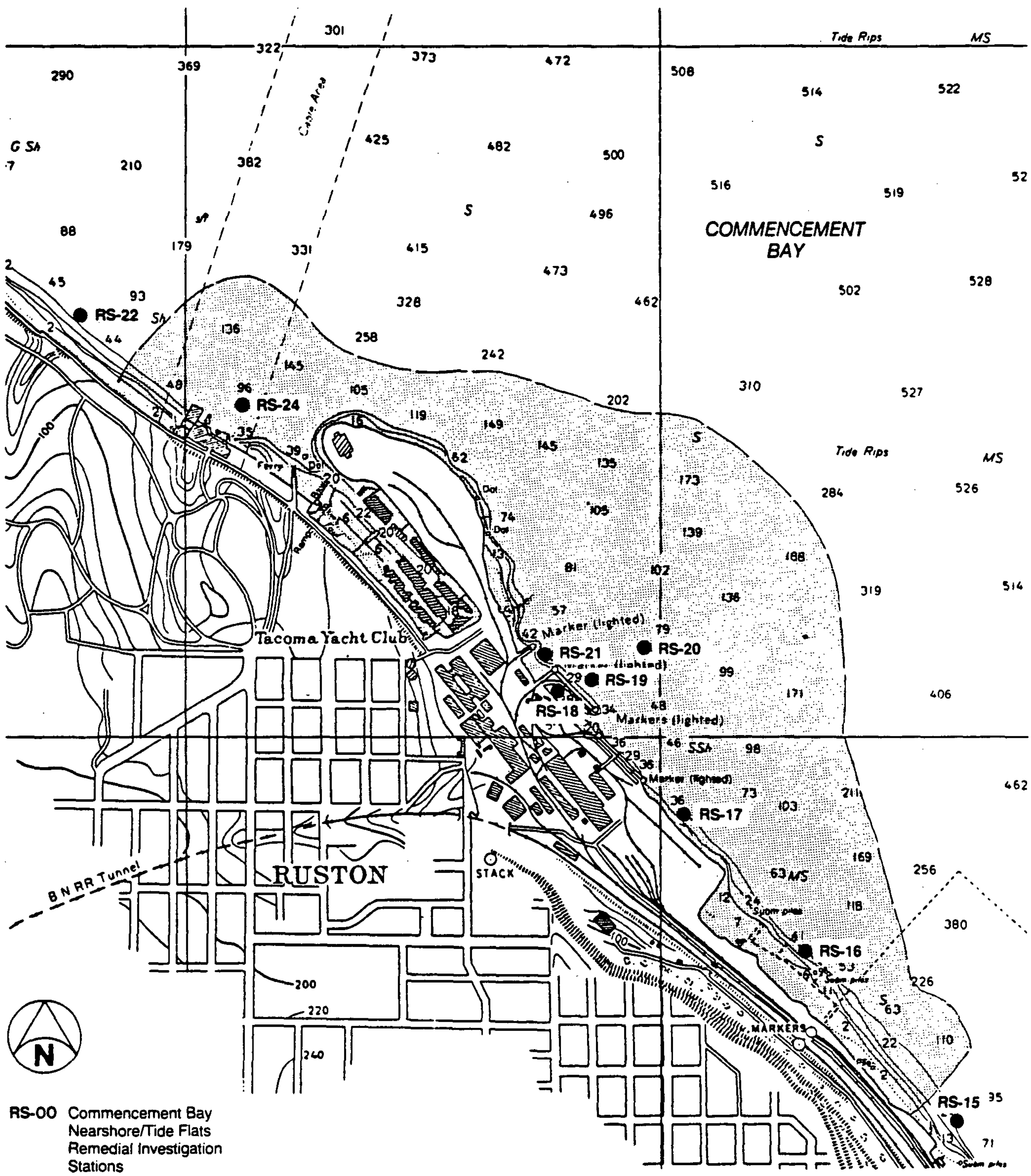
APPROACH: The Commencement Bay Nearshore/Tideflats Remedial Investigation has identified the general area in which contaminants are found that may have originated from the ASARCO site. This area extends from the shoreline to a depth of about 200 feet MLLW from north of the Tacoma Yacht Club to well south of the mill (Figure 2). Within this area and slightly beyond we would establish a grid of stations to be sampled for surface sediments. These surface sediments will be analyzed for four metals: arsenic; copper; lead; and zinc. This strategy is designed to provide the maximum number of samples for any given level of effort. The strategy is based on the data provided by the Nearshore Investigation that shows these four metals to be present at the highest concentrations of any contaminants in this area, and to be present in the greatest number of samples from the ASARCO vicinity. It is unlikely that any other contaminant will have a wider distribution or provide a concentration gradient that would indicate a broader area of contamination than these metals. The metals are also likely to be relatively resistant to degradation in the sediments and most likely have been present since the plants earliest operation. Thus they will provide a maximum measure of the depth distribution of contamination.

All surface samples will also be analyzed to determine the grain size composition of the sediments. Grain size and depth are the two most significant factors in addition to contamination that are likely to influence the distribution, abundance and species composition of benthic marine organisms.

Surface sediment sampling will be conducted in the fall or as soon as practical after award of a contract. Following analysis of these samples, the results will be assessed to define areas of relative contamination (high, intermediate, low, or whatever is justified by the results). The size, shape and depths of these areas will then be used to design stratified sampling programs for the depth distribution of contaminants and the biological affects of contaminants.

The depth distribution of contaminants will be determined by collection and analysis of core samples. These samples will be analyzed for the same four metals (As, Cu, Pb, Zn) as the surface samples. Additional analysis may be added if questions are raised by the result of the surface sampling that could be addressed by considering different parameters. The number and location of core samples will be based on the size, shape, and depth of the areas of relative contamination. During the surface sampling, several cores will be collected from the immediate

Figure 2.
Area of Commencement Bay in which contaminants originating from the ASARCO Mill may be found in marine sediments



RS-00 Commencement Bay Nearshore/Tide Flats Remedial Investigation Stations vicinity of the mill to identify the probable maximum depth of contaminants. The core sampling to determine depth of contaminants throughout the area will be conducted following analysis and assessment of the surface samples and initial cores. This detailed depth sampling is likely to occur in the spring of 1987.

Both the initial and the detailed depth sampling will be designed to sample the levels most likely to define the depth of contamination. The depths to be sampled in the initial cores will be defined by the core samples recently collected by Tetra Tech as a continuing part of the Commencement Bay Investigation. The detailed depth samples will subsequently be planned from the information obtained from the initial cores.

The biological assessment of importance of the various contaminant levels will be conducted through sampling and analysis of the benthic macroinvertebrate communities inhabiting the various areas of relative contamination. A stratified sampling program will be designed to collect adequate numbers of samples from each area of relative contamination. These areas will be defined by the surface sampling results, grain size analysis, and depth variation within each area. Sampling will be conducted by the methods and protocols recently developed for EPA studies in Puget Sound (EPA 301(h) and Remedial Investigation). Analyses of these data will employ various techniques commonly used in similar studies to define population characteristics and similarities between populations from different areas. This strategy will compare populations from each area of relative contamination among themselves as well as to adjacent uncontaminated areas. The studies will follow a QA/QC program developed specifically for the ASARCO investigation, but based on the Commencement Bay Nearshore/Tideflat Remedial Investigation QA/QC.

3.7 Receptor Identification Investigation

OBJECTIVE: The receptor identification investigation will collect and evaluate information necessary to identify and describe known or potential human and environmental receptors of contaminants associated with the site. Sources of contaminants, potential pathways for contaminant migration, potential exposure points, and potential human and environmental receptor populations will be described. Data collected under this subtask should also prove useful as a starting point for more detailed quantitative exposure assessments, endangerment assessments, or other analyses of human and/or environmental impacts that may be required as part of the RI/FS process.

A significant amount of data already exist regarding potential human receptor populations associated with this site such as the

Vashon-Ruston Study. Additional data will be identified during the work performed during the RI site investigation. This additional data will include information about migration pathways, potential human exposure points, and environmental receptors.

APPROACH: No new fieldwork will be initiated under this subtask. Existing data, and new data identified under subtasks 3.1 - 3.7 above, will be reviewed and summarized. This subtask will involve consolidation of all available data on major contaminant sources, migration pathways, exposure points, receptor populations, and where possible, data that may prove useful for constructing a quantitative exposure assessment or related health-assessment analyses.

3.8 Slag Leaching Investigation

Slag leachate monitoring will be conducted during the Remedial Investigation. The specific sampling program will be defined during the course of the Remedial Investigation.

Task 4 - SITE INVESTIGATION ANALYSIS

This analysis, described in part in the preceding section, will be a thorough review of all information collected in Tasks 1 and 3 of this RI/FS. The objective will be to ensure that the information generated is adequate to support the feasibility study and to identify and evaluate public health impacts. As a result of this analysis, additional data gaps may be identified that require additional site investigative work.

This task will bring together the results of the separate technical disciplines and will present them so that the relationships shared by the findings of each discipline can be clearly understood. The summary report developed under this task will identify the nature and extent of contamination at and surrounding the site and will identify potential receptors and pathways to those receptors that may result in an actual or potential threat to public health, welfare or the environment.

Task 5 - LABORATORY AND BENCH SCALE STUDIES

Laboratory and bench scale studies are not expected to be required as part of this RI/FS.

Task 6 - REPORTS

Reports will consist of monthly progress reports for the entire project and the preliminary and final reports of the findings of the Remedial Investigation.

The monthly progress reports will provide an up-to-date summary of the technical progress and management aspects of the project. Site stabilization reports will be included with the monthly RI/FS progress reports. These reports will form the basis for ASARCO's monthly reporting to the EPA. The reports will discuss site activities and progress on the RI/FS, difficulties encountered, actions taken to rectify problems, the results of sampling and analysis completed in the past month, planned activities for the following month, and changes in personnel. The progress reports will be prepared with two stand alone sections. The first section will deal with management aspects of the contract dealing with budgets, schedules and any other matters of concern between ASARCO and the consultant. The second part will be a technical progress report in a format suitable for submission to the EPA. The exact formats for these reports can be modified as the project progresses to meet any special needs that may arise.

The Remedial Investigation Report will contain the results of Tasks 1 to 5 and will incorporate supporting information in technical appendices. Upon receipt of comments and their incorporation into the document, a Final Remedial Investigation Report will be prepared for submission to ASARCO and the EPA.

Task 7 - COMMUNITY RELATIONS SUPPORT

It is difficult to predict the work involved in implementing the CRP until such a plan has been developed in coordination with EPA and the interested and affected public. However, for purposes of this proposal, it is assumed the three workshop-style public meetings will be held: One to inform the public about the planned RI/FS; one to report the results of the RI; and one to discuss the results of the draft feasibility study. It is anticipated that the meetings will consist of an introduction by EPA staff, a presentation by technical investigators, and a question and answer session. Concerns of the public will be documented to ensure appropriate response.

In addition to the public meetings, the CRP includes preparation of three fact sheets; publication of a quarterly newsletter describing the progress and significant findings of the RI/FS, and how public concerns are being addressed; assistance to EPA in briefing state and local agencies and the media; and preparation of a responsiveness summary.